PB-230 699

POLLUTION OF THE INTERSTATE WATERS OF THE POTOMAC RIVER (WASHINGTON METROPOLITAN AREA)-DISTRICT OF COLUMBIA-MARYLAND-VIRGINIA. PROCEEDINGS OF CONFERENCE HELD AT WASHINGTON, D. C. ON APRIL 2-4, MAY 8, 1969. VOLUME 2

Federal Water Pollution Control Administration
Washington, D. C.

1969

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INDEX

STATEMENT OF:	PAGE:
C. A. Hansen	557
G. E. Ferguson	562
C. E. Lake	571
M. C. Hope	582
N. E. Jackson	603, 633
Dr. Clair N. Sawyer	622
Potomac Electric Power Company	811
N. Loe	819
T. Pankowski	831
G. Harris	839
T. D. McKewen	850
P. W. McKee	864
A. Machis	901
F. Kellogg	926
H. A. Boswell	936
I. H. Sims	957
R. W. Straus	964
J. C. Holmes	973
J. B. Coulter	985
J. S. Hewins	997
V. A. Viehoever	1012
J. W. Malcolm	1017
A. E Robinson	1024
F. H. Farrar	1033
J. W Dixon	1085

April 3, 1969

9:30 A.M.

SECRETARY KLEIN: Good morning.

For those of you who weren't here yesterday, my name is Carl Klein. I am the Assistant Secretary of the Interior for Water Quality and Research.

I see a number of familiar faces back again this morning. I thought that the Federal Water Pollution Control Administration did a very creditable job yesterday. I think that the D. C., Virginia and Maryland representatives will do a like job today. We have a number of other people to hear from.

Now, due to a scheduling with the Secretary of the Interior for an appearance on the Hill this afternoon, I will be leaving you sometime between 11:15 and 11:30 and I will be back sometime this afternoon. In the interim, Mr. Murray Stein, the Assistant Commissioner for Enforcement, FWPCA, will be the Chairman of the meeting.

It is not contemplated that we will complete the public hearing today. We will probably have to go into tomorrow morning to complete all of this, and thereafter we should have the executive session in a closed session. I don't think that we really have any too controversial matters, but we have to put these matters together.

Immediately after the closed session, we will try to have a written statement to put it together for the press. I have asked the public relations groups to be ready and we will try to get these to you the minute that the session is over so that you have it in writing and so that you know what we are aiming at generally before we come out with the final report.

Mr. Jensen has a number of short announcements this morning, and then we will proceed with the normal order of business.

I think all of you have picked up a copy of the schedule for today and tomorrow morning.

Mr. Jensen.

MR. JENSEN: Mr. Chairman, the first announcement that I have is that the representative of the Department of Health, Education, and Welfare is not able to attend today. He has submitted a statement of agency interests for the record. We would like to have it included in the minutes of the record.

SECRETARY KLEIN: So ordered.

(The above-mentioned statement follows:)

STATEMENT OF
CHRIS A. HANSEN, COMMISSIONER
ENVIRONMENTAL CONTROL ADMINISTRATION
CONSUMER PROTECTION AND ENVIRONMENTAL HEALTH SERVICE
DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
AS SUBMITTED

The Department of Health, Education, and Welfare, acting under the Public Health Service Act has primary Federal responsibility for protecting the health of the people. The Public Health Service (PHS) has a strong interest in the protection and enhancement of community water supplies, both as to adequacy and purity for water reaching the ultimate consumer. Water as it is delivered at the tap should be potable and should meet the PHS drinking water standards. The swimmer in a stream or the person eating shellfish should have his health protected through maintenance of satisfactory levels of water quality in the related waters.

Under the Water Quality Act of 1965 and the Reorganization Plan No. 2 of 1966, the Secretary of Health, Education, and Welfare (HEW) was authorized to render consultation to the Department of the Interior on the public health aspects relating to water pollution and to advise on public health questions involved in determination of Federal agencies of the need for and the value of storage in Federal reservoirs for purpose of water quality control. In implementation of the above an Interagency Agreement between the Secretaries of HEW and of Interior was prepared and signed by President Johnson on September 1, 1966. This Interagency Agreement outlined public health aspects of water pollution and technical areas upon which HEW will provide advice to Interior and described the kinds of studies on the health aspects of water pollution which the PHS would conduct.

In 1914 the PHS established and, with periodic revisions, the last in 1962, has maintained and published drinking water standards for water supplies used on interstate carriers and has responsibility for the certification of such water supplies. These standards have been adopted or are used as the guidelines for drinking water quality in nearly all of the States. The PHS also served as consultant and technical assistant to State and local health departments in their programs for safeguarding the quality of community water supplies. Water supplies serving millions of people in the Washington Metropolitan Area are taken from the Potomac River.

However, the intakes are above Little Falls, the upper limit for consideration by this Conference and, therefore, the protection of these intake waters is not at issue here. It should be pointed out, however, that the use of Potomac water for water supplies is a key use and that any actions or proposals which might detract from the quality and quantity of the available in-stream water should receive serious analysis and consideration from a health protection standpoint.

In fulfilling our responsibilities regarding the health aspects of water pollution control, the Public Health Service has developed or is working on health guidelines for water resources development, including elements on water quality for domestic and food processing use, recreational development, vector control, land disposal of solid waste, shellfish growing and harvesting waters, and agricultural use of wastewater. With certain exceptions the water quality standards cited in Table 1-A of the report entitled "Potomac River & Water Quality, Washington, D. C. Metropolitan Area 1969" (Interior Report) appear to meet health objectives and compare favorably with the health guidelines.

Present water uses cited by the Interior

Report include recreation and navigation in addition to several others. Of the above uses recreation by body contact is the most significant with regard to health criteria, and for recreational use the element of bacteriological quality is most critical for the subject stretch of the Potomac River. Health criteria call for fecal coliform densities not to exceed a geometric mean of 200/100 ml on a basis of five samples per month taken during peak recreational use. According to Figure 7 of the Interior Report it is estimated that this level is exceeded from river miles 103 to 90. The high bacteriological counts clearly exceed acceptable health protection levels and merit attention.

A review of the Interior Report also indicates a variety of structural and operational problems relating to high bacteriological levels in the Potomac, including failure to operate certain treatment plants up to their expected efficiencies, ineffective chlorination of certain treated effluents and uncorrected stormwater overflow situations from combined sewers. We feel that special attention should be given to such aspects as can be made to yield early results.

A key recommendation of the Interior Report is for a 98% reduction in raw sewage fecal coliform densities. Without more information it would be difficult for us to pass judgment on the health impact of this degree of reduction. However, it is clear that to meet health criteria for body contact recreation in the Washington, D. C. Potomac area, significant new steps will have to be taken to control bacteriological sources of pollution.

I am pleased to represent the Department of Health, Education, and Welfare at this Conference. We stand ready to assist and cooperate with the Department of the Interior and others in any way we can in this important work of achieving satisfactory quality water for uses which the people demand and deserve.

* * * * *

MR. JENSEN: The Sport Fishing Institute has indicated that they will submit a statement for the record, and we would like to have the record kept open for at least several days so that they may complete their statement.

SECRETARY KLEIN: So ordered.

Our first witness for this morning is Mr. George Ferguson, Regional Hydrologist, U. S. Geological Survey. Mr. Ferguson.

G. E. Ferguson

STATEMENT OF
MR. GEORGE E. FERGUSON
REGIONAL HYDROLOGIST
UNITED STATES GEOLOGICAL SURVEY
DEPARTMENT OF THE INTERIOR

MR. FERGUSON: Mr. Chairman, Conferees, Ladies and Gentlemen:

I am George E. Ferguson, Regional Hydrologist of the Geological Survey for the Atlantic Coast Region.

The Geological Survey has been invited by FWPCA to describe some of our current and earlier studies, the findings from which might be used advantageously by those engaged in the control of water pollution in the Washington Metropolitan Area. It should be said that the U. S. Geological Survey is not engaged in the control of pollution. Yet, in its role as a fact-finding agency (1), it reveals much about the availability, movement, and quality of waters that is utilized by others in pollution abatement.

The amounts of water moving into and down the Potomac River system during droughts, floods and intermediate periods are now well defined. With such flow records, which are published annually (2), water resource agencies can design and manage storage reservoirs for quality control and relate upstream water conditions to movement of pollutants below Washington.

During rainless summer periods, the River flows needed to flush the Estuary recede in a well-established pattern. Public officials are able to determine from such recession trends, the most unfavorable water supply conditions that are likely to occur. Hydrographs of the flow of the Potomac River above Washington are updated monthly (Attachment A) and forwarded to interested agencies.

A sizable, varying but still unknown amount of water is held in natural underground storage in the Potomac Basin above Washington. This ground water feeds the River system and is vital during rainless and snowless periods. Hydrogeologists of the Geological Survey are now studying these natural ground water basins. They will give special attention to the practicability from a hydrologic standpoint of altering, by man-made measures, the natural drainage patterns of these ground waters with the objective of low-flow augmentation. Such ground waters might one day be used to supplement the control of river discharge in the Washington area contemplated by the use of surface reservoirs.

The determination as to how quickly a pollutant, accidentally spilled into the upper Potomac River, would reach water supply intakes for the Washington area is vital in pollution control. Hydraulic specialists have now established (3) the time of travel of water-borne pollutants and this information has been utilized by officials of the Dalecarlia Treatment Plant in coping with accidental spills of transported chemicals and petroleum products from up-basin events.

Better knowledge of the movement of water in the Potomac Estuary under various conditions of upstream inflow and tide has been a research objective for several years. Hydraulic specialists are able to calculate volumes of water moving in each direction during incoming and outgoing tides during any period for which water level records are available.

The movement of dissolved solids in the Estuary was studied also by the use of dye injection during August 1965 (4). Mathematical models now being developed to determine water movement, volume interchange and flushing time in certain other estuaries appear to be applicable for use in the Potomac Estuary near Washington.

The magnitude and sources of water-borne sediments in the Washington area are revealed in a number of reports of studies beginning in the early 1960's. The first, made in cooperation with the Interstate Commission on the Potomac River Basin, determined for the first time the magnitude of the sediment loads in various parts of the Potomac River system and the factors that affected this sediment yield. The report was published by the Commission (5).

The effects of local urbanization on the sediment loads in the Potomac Estuary are given in the reports of a number of studies made in the 1960's (6,7). The results of a study of sedimentation resulting from highway construction near McLean, Virginia, is awaiting publication (8).

The changes in sediment yields in small watersheds in the "fringe areas" under urbanization in Montgomery County and the reasons for such changes are being investigated. This is being done in financial cooperation with the Maryland-National Capital Parks and Planning Commission, the D. C. Department of Sanitary Engineering, and the Washington Suburban Sanitary Commission, and in collaboration with the Soil Conservation Service and the Agricultural Research Service. This ten-year project is now in its fourth year. The area under survey lies in the upper reaches of the Rock Creek Basin.

Knowledge of how much of the local waterborne sediments in the Washington area come from the upper basin is revealed through measurements at sediment stations on the Potomac River at Point of Rocks and on the Monocacy River. Records, published annually (9), were begun in 1960. A similar type station on the Northwest Branch of Anacostia River at Colesville has been also operated since 1962.

The first of a series of field studies was made of the extent of thermal loading and the rates of dissipation of heat in the Potomac River below the powerplant at Dickerson, Maryland. This is being done in close cooperation with the Potomac Electric Power Company. Dye injection was used to compare the lateral diffusion of dye with that of temperature, which was identified using thermistors. Stream temperature patterns in the heated portions of the River were also obtained by use of a helicopter-borne radiation thermometer. The helicopter was furnished by NASA.

Analyses of dissolved material -- the so-called "chemical quality" of stream waters -- are made of samples taken monthly from the Potomac River at Point of Rocks and from the Monocacy River. This work is done in cooperation with the Maryland Geological Survey and the results, published annually (9).

For those interested in the salinity of the upper Estuary we refer to GS Water-Supply Paper 1586-A (10), which reports on a study made in the vicinity of Fort Belvoir in 1954 and 1955 in cooperation with the Atomic Energy Commission and the Corps of Engineers.

A general description of the influence of up-River inflow and tidal forces on the water quality in the upper Estuary is available in the Survey' Circular 529-A (11).

A new experimental station on Rock Creek near the Calvert Street Bridge has permitted effective testing of monitoring equipment and transmission of teletyped data to a remote point. Equipment currently at the station includes a solid-state monitor for continuous measurement of five water quality parameters, and an automatic-type analyzer. The latter, which makes nitrogen and phosphorus determinations, is being tested for use under field conditions.

The U. S. Geological Survey is striving

to shape its local data collection program and to express the findings from its research and investigations in the Potomac Basin so as to have optimum value to FWPCA, the State and local water pollution control authorities, and all parties working toward pollution abatement. Its records and findings are public information and we will strive to make them available when needed.

REFERENCES

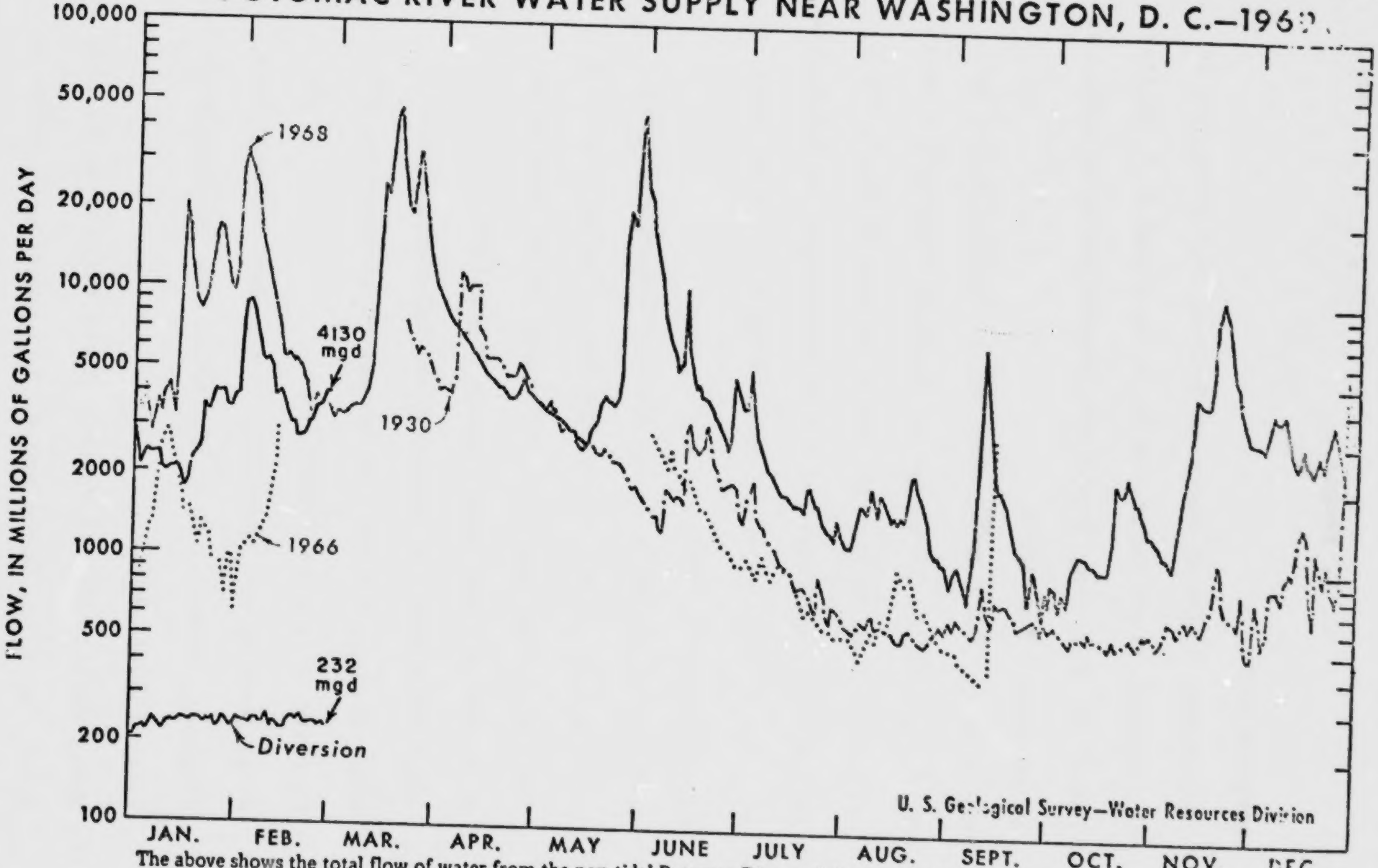
1. The Nation's River. A report on the Potomac by the U. S. Department of the Interior, with recommendations for action by the Federal Interdepartmental Task Force on the Potomac, October 1968 (page 115).
2. Water Resources for Maryland-Delaware (and an equivalent publication for Virginia), Stream Flow Records, annual publication by GS Offices in Towson, Maryland and Richmond, Virginia.
3. Time of Travel of Water in the Potomac River, Cumberland to Washington, by James K. Searcy and Luther C. Davis, Jr., USGS Circular 438, 1961 (12 pp).
4. Movement of a Solute in the Potomac Estuary at Washington, D. C., by J. F. Wilson, Jr., E. D. Cobb and Nobuhiro Yotsukura, USGS Circular 529-B (in final stage of

preparation).

5. Preliminary Study of Sediment Sources and Transport in the Potomac River Basin, by J. W. Wark and F. J. Keller, Technical Bulletin, Interstate Commission on the Potomac River Basin, June 1963.
6. Sediment in Small Reservoirs Due to Urbanization, by H. P. Guy and G. E. Ferguson, Journal, Hydraulics Division, American Society of Civil Engineers, March 1962.
7. Residential Construction and Sedimentation at Kensington, Md., by H. P. Guy, Misc. Publ. 970, U. S. Department of Agriculture, 1963.
8. Sediment Measurement in an Area of Suburban Highway Construction, Scott Run Basin, Va., 1961-64, by R. B. Vice, H. P. Guy and G. E. Ferguson, to be published as a part of USGS Water-Supply Paper 1591.
9. Water Resources for Maryland and Delaware, Part 2, Water Quality Records, an annual publication by USGS District Office in Towson, Md.
10. Water Quality and Hydrology in the Fort Belvoir Area, Virginia, 1954-55, by C. N. Durfor, GS Water-Supply Paper 1586-A, 1961.
11. Water Quality of the Potomac River Estuary at Washington, D. C., by W. H. Durum and W. B. Langbein, GS Circular 529-A, 1966 (9 pp).

Attachment A

POTOMAC RIVER WATER SUPPLY NEAR WASHINGTON, D. C.—1969



U. S. Geological Survey—Water Resources Division

The above shows the total flow of water from the non-tidal Potomac River and the total of diversions for water supply in the Washington metropolitan area. Total river flows for 1968 and for portions of 1930 and 1966 are included for comparison with current conditions. The difference between river flow and total diversions represents the inflow to the head of the Potomac Estuary. Sediment discharge from the Potomac River basin above Washington was approximately 18,000 tons during February

This report is issued monthly except during low-flow periods when more frequent release of information is justified for appraisal of w -supply conditions.

3/5/

MR. STEIN: Thank you.

Are there any comments or questions from the conferees?

(There was no response.)

MR. STEIN: If not, thank you very much, Mr. Ferguson.

The next speaker will be Mr. Charles Lake, representing the Regional Director, General Services Administration.

STATEMENT OF
MR. CHARLES E. LAKE
CHIEF, MAINTENANCE-UTILITIES BRANCH
GENERAL SERVICES ADMINISTRATION

MR. LAKE: Mr. Chairman, Ladies and Gentlemen:

This is a report by the General Services Administration, Region 3, which is the metropolitan area of Washington.

Under the two legislative acts of the 89th Congress, the Water Quality Act of 1965 and the Clean Water Restoration Act of 1966, the Federal Government, the States, local communities, and industry have been given the task of cleaning up the polluted waters and eliminating any further polluting of those bodies of water. The role of the Federal Government in this program has been clearly identified in Executive Order 11288, dated July 2, 1966.

General Services Administration, Region 3, is committed to an active and persistent program to assist in the elimination of pollutants into our water wherever they may occur. Region 3 embraces the District of Columbia, the States of Maryland, Virginia and West Virginia, and includes 424 Government-owned buildings or approximately 43,800,000 square feet of assignable space and three major heating plants in the Metropolitan Washington Area.

ACCOMPLISHMENTS TO DATE

An aggressive program to eliminate existing water pollution violations has been undertaken. In cooperation with the Federal Water Pollution Control Administration of Charlottesville, Virginia, we have been able to identify some installations where violations were apparent. These we have been able to cope with successfully. Our accomplishments to date include, but are not restricted to the following:

1. General

All chemical wastes from the Old Bureau of

Standards Site at 4200 Connecticut Avenue are packaged and transported to military installations where they are burned or buried. Industrial waste from the Printing Plant of the McLean Field Office is channeled to a dilution tank and pumped to sanitary sewers. Backflow preventors have been installed in the standpipe system at the Veterans Administration Building.

2. West Heating Plant

On November 8, 1966, the Federal Water Pollution Control Administration of Charlottesville, Virginia, investigated the waste disposal practices of the GSA West Heating Plant. They concluded that, "all domestic wastes discharged from this installation during dry weather conditions receive treatment at the Blue Plains Waste Treatment Facilities of the District of Columbia, and the industrial waste discharges are not currently considered detrimental to stream quality."

This report had no pollution abatement requirements and has recommended only that "the FWPCA be informed of any changes in operation and waste disposal practices at the West Heating Plant."

3. Central Heating Plant

Several changes have been made at the

Central Heating Plant. Non-harmful chemical treatment has replaced the older, more toxic treatment in the chilled water lines of the airconditioning system.

Installation of a new settlement tank and the connecting of the boiler blowdown lines into the sanitary sewer system have been recently completed.

Prior to August 1967, all industrial wastes from the Central Heating Plant entered a combined sewer system which discharged to the District Treatment Plant. In August 1967, the District separated the combined sewer and discharged the storm sewer directly to the Potomac River at the Washington Boat Marina.

4. Virginia Heating Plant

All boiler blowdowns and possible chilled water dumpings go through a newly constructed sewer line to the Virginia Sewage Disposal Plant. The coliform count, which is a measure of bacteriological activity of the effluent from the Virginia Sewage Disposal Plant, is well within the prescribed limits. Monthly records of other significant tests have been kept since January 1967 in order to better evaluate the treatment. A chlorine line has been installed so that free chlorine residual in the effluent is maintained.

SIGNIFICANT ADDITIONAL ACHIEVEMENTS

Most of the District of Columbia has been on a combined storm-sanitary sewer system. During thunderstorms, this system is overloaded and the overload is dumped into the river. The District has been gradually changing over to separate storm and sanitary sewers. Concurrent with this change, dual sewers have been separated in the Agricultural Buildings Complex, Federal Building 1, Federal Building 6, Federal Building 8, HEW (North), HEW (South), and General Services Administration, Regional Office Building. Furthermore, plans for all new Government construction are submitted to the Federal Water Pollution Control Administration for clearance.

In anticipation of the District Government' sewer separation program, wherever construction projects in our public buildings will permit, we are making separations of sanitary and storm sewer lines.

In our efforts to conserve treated water, we have converted many airconditioning units to air-cooled condensers and towers instead of dumping to the sewers, thereby preventing chemicals from entering the sewer system.

In order to minimize the amount of nutrients entering the sewage system, we are making intensive studies of new water treatment procedures.

Although not a GSA installation, at the request of officials of the National Zoological Park, our Design and Construction Division is designing a disposal system to divert animal waste into the sanitary sewage system.

Recognizing the threat to clean water imposed by airborne pollutants, our heating plants and incinerators have high performance precipitators which have proven to be highly effective in removing particulate matter from flue gas.

PROBLEM AREAS FOR FURTHER INVESTIGATION

While we are not alarmed over the present practice of dumping treated water into the combination storm and sanitary sewers, we are interested in the progress of the District Government in their program to separate these sewers, as it will reduce the risk of pollution.

Overflow water from the Central Heating Plant's ash sluicing system is discharging into the storm sewer which empties directly into the Washington Boat Marina and thereby causing a buildup. General Services Administration has dredged this area on several occasions. The relocation of boiler blowdown from the ash sluiceway to the sanitary sewer should materially reduce overflow and resultant carryover. A bypass, to pump accumulated sludge back to the ash hoppers rather than discharge to the sewer, has also been installed. This sludge is not harmful from a water pollutant point of view.

FUTURE OBJECTIVES

A program of periodic inspections has been instituted to detect any violations of acceptable waste disposal practices. Technical advice and assistance will be given to our field managers to correct deficiencies detected by inspections. Further assistance will be given to agencies desiring design or construction capability to solve water pollution problems related to their functions.

Utilizing the skills of competent professionals, a highly imaginative program encompassing an exhaustive survey of all potential sources of contamination is being developed to not only correct any present problem, but to prevent any future problem.

General Services Administration, Region 3, will continue to extend their cooperation with skills and facilities to assist other agencies of the Federal Government in their continuing efforts to eliminate pollution as a major social concern.

Thank you.

SECRETARY KLEIN: Thank you, Mr. Lake.

Are there any questions from the conferees on my left?

(There was no response.)

SECRETARY KLEIN: Any questions from the conferees on my right?

MR. JACKSON: Mr. Chairman, the District of Columbia seems to get the distinction of going first. Would you like to go first?

MR. HOPE: No, sir. Age before beauty.

MR. JACKSON: I would like to make a comment with respect to the statement on page 2: "Most of the District of Columbia has been on a combined storm-sanitary sewer system."

I would like to mention that the present part of the system remaining on combined is only 32 percent of our total sewerage system.

And with respect to the buildings, and I am referring again to the same paragraph on page 2, "Significant Additional Achievements," there has been a provision in the District of Columbia Permit Code ever since, I believe, the early 1960's that requires new construction in the District of Columbia to separate the sewerage systems within those buildings, so I would assume that perhaps General Services is continuing to do that at the present time.

SECRETARY KLEIN: They have it in the last paragraph on page 2.

MR. JACKSON: Yes. That was my comment, Mr. Chairman.

SECRETARY KLEIN: Fine. I have a comment. On page 3 they say: "In order to minimize the amount of nutrients entering the sewage system, we are making intensive studies of new water treatment procedures."

I just want to let you know that is not a duplicating function, that each and every time they do that they come to FWPCA for comments. In other words, they use our techniques and apply them locally, and we are not having two different studies at the same time.

Thank you very much, Mr. Lake.

MR. HOPE: I have a short one, Mr. Lake, if you would, please.

In making reference to your West Heating Plant on page 1 of the report, it says: "All domestic wastes discharged from this installation during dry weather conditions." What happens during wet weather flow conditions?

MR. LAKE: Well, I would assume that perhaps we do get some overflow from the storm sewers.

MR. HOPE: That is the implication.

MR. LAKE: This was taken verbatim from the report of the FWPCA.

MR. HOPE: May I ask also, and this may not be a proper question to direct to you, Mr. Lake but on page 3, in the third paragraph, you make some reference to the present methods of disposal of the animal wastes from the zoo.

MR. LAKE: Yes, sir.

MR. HOPE: What is the current practice, as a matter of curiosity?

MR. LAKE: I understand that this design is in our central office. I represent the region. We understand that they are working on a design with the zoological park on this distribution. That is all I can say on it.

SECRETARY KLEIN: If I may, Mr. Jensen has the exact answer. Mr. Jensen.

MR. JENSEN: Mr. Chairman, the information I have is that the final plans for this particular plant have been completed, and we estimate that it will be finished up by July of 1969. There are a number of other Federal establishments --

SECRETARY KLEIN: Just a minute. What do they do with the wastes from the zoo now? That was the question. You are talking of Rock Creek.

MR. JENSEN: I think that most of it has now been removed through connections to sanitary sewers, but there are still some remaining units at the zoo to be tied in. Until recently, most of it ended up in Rock Creek.

SECRETARY KLEIN: Fine. Thank you.

MR. JACKSON: Mr. Chairman, the District of Columbia works fairly closely on the problem with the zoo. Mr. George Moorehead is in the audience. It was my understanding that the plant had been completed and that this is to handle the surface washings from the outside pens, and this means then that we do have a retention tank and that catches it during the stormwater overflow, holds it, and when the storm has subsided we leach back into the system at a much reduced rate and treat it at our plant.

George, if I haven't put it correctly,

would you correct me?

MR. MOOREHEAD: That is exactly correct.

SECRETARY KLEIN: Fine. Then, in other words, we have met the problem at the zoo already?

MR. MOOREHEAD: Insofar as the existing buildings are concerned, they are taken care of. The new buildings will be attached into the same system.

SECRETARY KLEIN: Thank you very much. Thank you, Mr. Lake.

We now have Mr. Eugene Minney of Indiana, Co-Chairman, Izaak Walton League. Mr. Minney.

(There was no response.)

SECRETARY KLEIN: We will hold that.

At this point we have the presentation of the District of Columbia portion of this conference, and I would like to turn that portion over to Mr. Malcolm Hope. Mr. Hope.

STATEMENT OF
MR. MALCOLM C. HOPE
CONFEREE AND ASSOCIATE DIRECTOR
FOR ENVIRONMENTAL HEALTH
DEPARTMENT OF PUBLIC HEALTH
DISTRICT OF COLUMBIA

MR. HOPE: Mr. Chairman, Fellow Conferees,

M. C. Hope

Ladies and Gentlemen:

I am Malcolm C. Hope, Associate Director for Environmental Health, District of Columbia Department of Public Health. The Department of Public Health is the official water pollution control agency for the District of Columbia. The Department of Public Health together with the District's Department of Sanitary Engineering have major responsibilities in regulating and controlling water pollution within the District of Columbia. The Department of Sanitary Engineering is responsible for the planning, construction, and operation of the municipal wastewater collection, treatment and disposal facilities. Both Departments participate fully in the activities of the Metropolitan Washington Council of Governments (COG), the Potomac River Basin Advisory Committee, and the Interstate Commission on the Potomac River Basin (ICPRB).

Today's meeting has been identified as the third session of the conference held in August 1957 (first session) and February 1958 (second session). Accordingly, it seems appropriate to use the recommendations of the 1958 session as the baseline for the current discussions.

In 1958, the Potomac River Estuary and

its tributaries in and around Washington, D. C. were grossly polluted. Considerable progress has been made in wastewater collection, treatment and disposal during the past eleven years. However, in 1969 pollution is still a serious problem and anticipated levels of pollution control have not been fully achieved. We recognize that much more needs to be done if the quality of our waters is to be enhanced. Mr. Norman E. Jackson, Director, Department of Sanitary Engineering, will provide a detailed description of the District's contribution to this effort. I wish only to point out that the cost of new interceptor sewers and treatment plant additions since 1957 has been approximately $50 million. This does not include the $28 million cost of the Potomac Interceptor serving upstream Maryland and Virginia and discharging to the D. C. Sewage Treatment Plant or the cost of the sewer separation program.

Like many other cities, the District of Columbia is caught up in the "Clean Water" crisis. The public demands, and certainly is justified in demanding, that more be done to reverse the deteriorating trend in the quality of our environment. As most of us here today know, recent amendments to the Federal Water Pollution Control Act, notably the Water Quality Act of 1965 (P.L.89-234), reflect increased concern of the public over the condition of our rivers, streams, estuaries, lakes, and coastal waters.

Pursuant to provisions of the Act, the District of Columbia adopted Water Quality Criteria and a Plan for implementation and enforcement of the criteria. This combination of criteria and plan make up our water quality standards. The standards were first adopted by the Board of Commissioners in June 1967 and were revised and resubmitted to the Secretary of the Interior in October 1967 and December 1968. Full approval was given by the Secretary January 17, 1969, just about two and a half months ago. The District's present water quality criteria reflect the suggestions and recommendations made by the Secretary of the Interior and all past exceptions to these criteria have now been removed. When the water quality criteria and uses were first developed in June 1967, recognition was given to the Federal guidelines which called for attainable standards in five years with an additional five years being allotted for solution of more difficult pollutional problems such as combined sewage and storm water discharges.

The District's Revised Water Quality

Criteria and Uses now reflect desired water quality uses and objectives but not goals achievable within the next five year period.

This situation reflects, I think, the present state of the art of water pollution control. Much of the technology in use today is at least forty years old. We have not yet found economically feasible methods for dealing with combined sewer overflows. What about so-called "clean" storm water? We know it is heavily polluted by the filth and chemicals washing off our city streets and private property, yet it is usually set aside in pollution control plans because no one knows what to do with it. Thus, when the Department of Public Health with the Department of Sanitary Engineering began to develop water quality standards, it soon became apparent that we did not have the tools needed to implement a plan which would guarantee the desired results. Lacking such tools, it was decided that quality criteria reasonably capable of achievement would be established. The next step was to design a plan which reflected the engineering technology and knowledge available to us at that time. These proposals received mixed reactions at our first public hearing held in June 1967. However, it should be noted that despite widespread public notice, only thirteen persons or organizations -- let me repeat that -- only thirteen persons or organizations testified or submitted statements for the record. As a result, we do not feel that we know what our citizens are willing to support in the way of capital expenditures for pollution control. However, we did learn what the Interior Department wanted from the District in terms of water uses such as swimming in the Potomac River and wading in Rock Creek Park.

Mr. Chairman, the District of Columbia water quality criteria are desirable objectives since in each case they represent very substantial improvement in water quality and uses. However, I feel the questions raised during the development of the standards still remain unanswered and that the purpose of this conference should be to seek the answers in an open forum. The questions as we see them, are:

1. Is the fresh water zone of the Potomac Estuary understood to the extent that its behavior under existing and future conditions can be predicted? A resolution of the Regional Sanitary Advisory Board raises a question in this regard and the Council of Governments has recommended that studies designed to give us a better

understanding of the estuary be initiated at the earliest possible moment.

2. Assuming the answer to Question No. 1 is "Yes," how should the "allowable" waste load be apportioned among the communities in the area?

3. Is it economically feasible to reduce current waste loadings to the levels recommended in the FWPCA report entitled "Potomac River Water Quality, Washington, D. C. Metropolitan Area - 1969" and do the cost benefits justify this level of expenditure?

4. Should not the Potomac River be a regulated stream with flow augmentation being utilized in any future planning for water quality maintenance in addition to waste treatment?

In answer to these questions, consideration must be given to combined sewer overflows, storm sewer discharges, and upstream water quantity and quality.

Having identified these basic issues, I now wish to describe for you some of the District's activities aimed toward pollution abatement. As I indicated earlier, the Department of Sanitary Engineering has an extensive construction program designed to improve and expand the D. C. Water Pollution Control Plant and reduce the amount of combined sewage discharged during periods of rainfall. In constructing these projects, full advantage has been taken of available Federal Grant funds. In every year since the start of the Federal Construction Grant Program in 1957, the District has used the full amount of its allotment. Although these funds have totaled almost $10 million through Fiscal Year 1969, the twenty-one projects planned or constructed with Federal assistance were eligible for considerably more.

In June 1968 the Department of Sanitary Engineering initiated a comprehensive study of the D. C. Water Pollution Control Plant. The study has been completed and will be discussed by others. It suffices for me to say that it is but one example of the forward looking attitude of that Department.

A few Federal installations, and you have just heard a report from the Government Services Administration this morning, contribute to the pollution problem. While the quantity of wastes is small compared to the total waste load, local effects are serious. In each case, abatement efforts have been made. More needs to be done. The General Services Administration has presented a status report and abatement plan to this conference.

The Department of Public Health and the Department of Sanitary Engineering cooperate in an extensive surveillance program. Weekly or bi-weekly samples are collected by the Department of Sanitary Engineering in the Potomac River from Maryland Point to Fletcher's Boat House (some 20 sampling stations) and in the Anacostia River from the mouth to the D. C. line (some 7 sampling stations). The Department of Public Health collects samples weekly in Rock Creek (5 stations), Oxon Run (2 stations), and Hickey Run (3 stations). Expansion of this program to include Watts Branch and other streams in the District is planned. Above the District, the Department of Public Health samples eleven Potomac tributaries and the Potomac at Point of Rocks on a weekly basis. Analyses of stream samples taken above the District are performed by the Washington Aqueduct. The Department of Sanitary Engineering conducts daily checks of the control devices on the combined sewer overflows in Rock Creek valley to assure their proper operation.

As part of a stepped-up enforcement program, we have asked all industries discharging wastewaters to submit abatement plans. Most have indicated a willingness to cooperate. The District Council is considering regulations developed by the Department of Public Health to control pollution from vessels, soil erosion, and other sources. A "Spill Alert System," designed to provide the Department of Public Health with rapid notification of spills of hazardous substances is now operating. Participating are the Metropolitan Police Department, the D. C. Fire Department, and the Department of Sanitary Engineering.

In summarizing, may I say that I feel the District has a sound water pollution control program. However, much more needs to be done if the water quality standards are to be realized. Planned programs for improving the Potomac must be limited to programs which are technically and economically feasible as well as politically acceptable.

I hope this conference will provide the mechanisms whereby coordinated pollution abatement programs directed toward achieving the established water quality criteria will be developed and implemented.

Thank you.

This concludes my formal statement this morning. At this time I would like to turn the podium over to Mr. Norman Jackson, who, as you know, is the Director of the Department of Sanitary Engineering, who will provide you with additional information on the detail and depth of the work of that Department in carrying out their responsibilities in this area.

Mr. Jackson.

SECRETARY KLEIN: Mr. Hope, I wonder whether you would be willing to answer some questions first.

Do any of the conferees on my left wish to address any questions?

(There was no response.)

SECRETARY KLEIN: Conferees on my right?

(There was no response.)

SECRETARY KLEIN: I have a number of questions, if I may.

You say you have been taking weekly and bi-weekly samples out of Rock Creek and the rest of the Potomac River. Do you have any idea what the conditions are as to coliform bacteria, fecal and otherwise, and fecal streptococci in these different streams?

Do you agree in the main with what was presented here yesterday by FWPCA as to --

MR. HOPE: If I may, Mr. Chairman, I would like to call on Mr. Arnold Speiser of our Department, who is immediately and directly involved in the handling of these results, to reply to that particular question.

If you would, Mr. Speiser?

SECRETARY KLEIN: Fine.

MR. SPEISER: Mr. Chairman, I would say that in general our findings agree with those presented by FWPCA. Rock Creek is polluted.

SECRETARY KLEIN: Would you wade in it?

MR. SPEISER: No, I wouldn't.

SECRETARY KLEIN: How about the Potomac and Anacostia Rivers? Would you wade in it or swim in it?

MR. SPEISER: No, sir.

I might also point out that the eleven tributary streams that we sampled above Little Falls in Virginia and Maryland are generally polluted.

SECRETARY KLEIN: What percentage, or do you have any readings on them?

MR. SPEISER: Percentage of what, sir?

SECRETARY KLEIN: Well, what counts do you have on coliforms and streptococci and salmonella?

MR. SPEISER: Well, we don't have any streptococci data. There was a very limited study on fecal streptococci done by the Potomac River Commission staff a few years ago which certainly indicated that they were present in certain places. Most of our data is limited to the total coliform in the tributary streams.

SECRETARY KLEIN: What do you run to about, in counts?

MR. SPEISER: Well, I was going to say, sir, that in almost all cases they exceed the 1,000 figure that was mentioned earlier. I would say that it is a rare occasion when the total coliform is less than 1,000 in any stream that we sample.

SECRETARY KLEIN: What does it usually run, or do you have any idea, in the different streams?

MR. SPEISER: I would say that it usually runs anywhere from 2,000 to 250,000 plus.

SECRETARY KLEIN: 250,000 plus? When do you hit that and where?

MR. SPEISER: I can't tell you all the streams in which this occurred. It certainly does occur in Rock Creek and it does occur in several of those eleven tributaries that I mentioned, and it is often associated with heavy rainfall, but not always -- but often.

SECRETARY KLEIN: Would you have any idea how it gets into Rock Creek?

MR. SPEISER: Yes. First of all, I may

point out that our furthest upstream sampling point in Rock Creek is at the District line. We don't sample Rock Creek above the District nor, do I think, anyone else does. So we feel that some of the pollution certainly comes down from Maryland, and we are told that one of the contributing factors is the septic tank problem. There may be overflowing sewage and that sort of thing.

We do have fecal coliform data in Rock Creek which certainly indicates that there is fecal pollution coming into the District. It does increase to a certain extent as the creek flows through the District, and, as others have stated, part of this is due to the combined sewer problem which would make its contribution normally in a heavy rainfall.

But there definitely is fecal pollution coming down from Maryland. There is no question about that.

SECRETARY KLEIN: Fine. I understand that the FWPCA has definite data on Rock Creek outside of D. C. and I will ask Mr. Jensen to put that into the record, if he will, please.

MR. JENSEN: Perhaps Mr. Aalto will say just a few words about it.

SECRETARY KLEIN: Would you clear the rest of that up?

MR. AALTO: Our laboratory in Annapolis completed a survey in 1966 and this was the subject of a report on Rock Creek, but, in addition to that, each August we have repeated a survey,* and we currently have in preparation a report updating all the data on Rock Creek, so that we have rather complete information on this which corroborates the fact that there hasn't been any significant improvement in conditions of Rock Creek since the original survey of 1966.

SECRETARY KLEIN: Let me ask you this question: What are the counts above the D. C. line, and where do the coliforms come from in Maryland into Rock Creek?

MR. AALTO: We have fairly high counts all the way up to close to the headwaters, but the counts are highly variable. It varies according to the time of the year and the condition of the stream, depending on rainfall, but some of the fecal coliform counts originate close to the headwaters, and the survey that we made was before the sedimentation reservoirs were built by the Maryland National Capital Parks and Planning Commission.

Some of this originated from cattle; some of it originated in the creeks. We haven't determined the cause of this, because this area is generally well sewered, but there are some areas that are not completely served by the Washington Suburban Sanitary Commission and it is possible that some leaching from septic tanks occurred in these areas.

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*The report and results of surveys, marked as exhibits, are on file with HQ, FWPCA, and the Regional Office Charlottesville, Virginia.

SECRETARY KLEIN: Thank you. I would appreciate your looking into it. We had a note here that it could be from septic tanks, and I would appreciate it if the next time you double check it out and make sure whether or not it is.

MR. AALTO: Yes, sir.

MR. HOPE: I might point out, Mr. Chairman, that the bacteriological findings of our Department as they are developed are made available to the FWPCA.

SECRETARY KLEIN: I understand that the two of them have been working closely together. That is another proposition. We are not getting into duplications here, and I think it should be brought home that the two agencies are not doing the same work, that they are doing work that is cooperative and that they have been coordinating.

MR. HOPE: Right.

SECRETARY KLEIN: One of the things that you brought out here is about stream augmentation, and, of course, you and I know that stream augmentation is not a substitute for proper sewage treatment. You have to have proper sewage treatment first, and if you have stream augmentation, that is additional.

Is that correct?

MR. HOPE: This is a debatable subject. I don't think that this is the proper time and place to raise it.

We recognize the fact that your own report, which we are using as a basis for this conference, recognizes that some 16,000 pounds of BOD can be assimilated by the river if through the mechanism of stream augmentation the absorptive capacity of the river is increased.

I think you in your own criteria spelled out in your reports, Mr. Chairman, have to recognize the increased absorptive ability of the estuary.

SECRETARY KLEIN: I will just read you Section 3(b)(1) of the Federal Water Pollution Control Act: "...except that any such storage and water releases shall not be provided as a substitute for adequate treatment or other methods of controlling wastes at the source." So when we start out, we cannot use the flow augmentation as a substitute. That is the Federal law.

MR. HOPE: The one critical word in what you read from, though, Mr. Chairman, is the word "adequate," and I think there is room for some possible further discussion as it relates to the desirability of the flow augmentation.

Of course, here in the District we think of this not only from the standpoint of the water pollution control problem that exists within the area, but the need to do some future planning in connection with the possible augmentation in support of a water supply for the District of Columbia, and this should be part of the total planning as it relates to the whole Potomac River Basin.

SECRETARY KLEIN: You also called in Point Number 1 for more study herein, and, insofar as I am concerned, and I think this follows through, this is a delay. We can't wait for better water. We are just going to have to do the best we possibly can. We will have to get better water as we go along and keep finding out more and more about this estuary.

If we state that we have to have studies and studies, we will have studies with no action, and I don't think that that is the answer. I think the answer is action now and studies at the same time.

Would you agree with that?

MR. HOPE: Yes, sir. I don't think we meant to imply that all progressive work be stopped until such time as the studies have been completed. But I think what we were suggesting is that the mathematical approaches, the models that have been designed as it relates to the estuary and its ability to perform certain functions in this area are not too clearly understood, and that hopefully, while we are moving ahead in carrying out abatement activities, that it will be possible to develop a better knowledge of what actually transpires within this tidal area that we are dealing with and which is the recipient of the treated wastes from the District of Columbia.

SECRETARY KLEIN: We run into this everyplace we go on the question of "We want to do more studies on something before we do something."

I didn't criticize you in that. I asked you for an agreement with the statement that I made so that we clarify it.

Again, in the third portion as to who will do what on apportionment and who will be allowed to put how much into there, we run into this all over the country. And, again, to make it clear, if everybody does the best they possibly can, it is not a question of apportionment -- how much pollution you are going to put in and how much the other is going to put in--but how much we are going to reduce it in order to make this a better stream.

And I guess you and I agree on that too, do we not?

MR. HOPE: There is a question of semantics, sir.

SECRETARY KLEIN: Lastly, we are back on dollar value. You and I know, and I think I made the statement yesterday, that we have to sell the public on this thing. I think Dr. Stephan made it clear that the cost of treating sewage is much less on capital expenditure than it is for electricity, gas and telephones, and what we have got to bring home to the public is that actually while we are talking large amounts of dollars, we are talking about small amounts for each and everything as a public utility, and that is what this is.

We have to bring this home to them, and actually on a dollar study it is very feasible, because without water we get sickness, without pollution abatement we get sickness, and then they will be spending it in dollars elsewhere, and then we haven't got the people around to pay for the electricity, the telephone and the gas.

I think you and I again are agreed on that. It is just a question of presenting it properly to the people.

MR. HOPE: That's right, and, hopefully, with a better way of presenting to the public the benefits which will accrue as a result of the expenditure.

If I buy a package of cigarettes, I know that I am putting additional coffin nails in my casket. If I pay the electric bill, I know I can turn on the lights. Hopefully, we can begin to develop a little better in the way of a presentation to John Q. Public as to what he will receive from the dollars that he is spending.

I remind you of the statement of Mayor Washington which was presented at the abatement conference yesterday, where he pointed out that as the chief official of the District of Columbia he has to operate within a fixed budgetary level and he has to make choices regarding the priority of programs. Again, hopefully we can bring together the evidence to better convince him that possibly more dollars from tax revenues can be diverted into the water pollution control activities by the District of Columbia.

SECRETARY KLEIN: I don't know whether I should direct the question to you or to Mr. Jackson and ask what proportion of the budget of the City of Washington, D. C. goes towards water pollution control?

MR. HOPE: I would suggest that you direct it to Mr. Jackson. I know that he has the answer to that question available.

SECRETARY KLEIN: Thank you. Any further questions by the conferees of Mr. Hope?

(There was no response.)

SECRETARY KLEIN: Thank you, Mr. Hope.

Mr. Norman Jackson.

STATEMENT OF
MR. NORMAN E. JACKSON
CONFEREE AND DIRECTOR
DEPARTMENT OF SANITARY ENGINEERING
WASHINGTON, D. C.

MR. JACKSON: Mr. Chairman, I thought I

would have an opportunity of presenting my statement before getting to the questions, but I see I don't have that.

Mr. Chairman, we looked into the question of the apportionment of budget. I can see that our budgets from 1958 to the present in terms of expenditures for water pollution control efforts has practically doubled. It is a relatively small portion, as you well realize, of a total District budget, but nevertheless it is a fairly consistent and rather significant proportion of the budget of our Department of Sanitary Engineering. I would say that offhand the percentage would vary somewhere in the realm of about 1 percent of the total District budget in 1958 to perhaps 2-1/2 to 3 percent. My staff may correct me on that.

Mr. Chairman, shall I proceed with my statement now?

SECRETARY KLEIN: Yes. I was going to reserve the question, but you have answered it already.

MR. JACKSON: Thank you.

MR. JENSEN: Mr. Jackson, do the conferees all have copies of the statement?

MR. JACKSON: They do. They were presented yesterday, or I think, as a matter of fact, even earlier.

I am Norman E. Jackson, Director of Sanitary Engineering, District of Columbia. The Department which I represent is responsible for the planning, construction and operation of the District of Columbia's water distribution system, sanitary, and storm sewers, wastewater treatment facilities, and the collection and disposal of solid wastes. In carrying out these responsibilities we cooperate closely with the Department of Public Health which is the regulatory agency and the official water pollution control agency for the District of Columbia.

At the outset, I wish to state that it is the Department's objective to provide the best treatment attainable for the wastewaters of the District of Columbia consistent with achieving approved water quality criteria, a feasible technology, and the appropriations necessary to plan, construct and operate the facilities required for implementing that objective. Our task is to determine the engineering works which will achieve this objective and then to obtain the necessary financial and qualified manpower resources to construct and operate these facilities.

I shall now touch on a number of aspects of our water pollution control program effected since the last conference.

Interceptor Sewers

One of the first requirements of an effective water pollution control program is the interception and conveyance of wastewaters to a point where treatment can be provided. The construction of adequate interceptor sewers has, therefore, been given major consideration in the District of Columbia's water pollution control effort.

The latest and largest effort is the project generally known as Project "C." This project was getting under way at the time of the last conference and has been continued under construction since that time. Unfortunately, the full project has not been completed as anticipated due to right-of-way problems beyond the control of the Department of Sanitary Engineering, and I cited this yesterday. Deferral of construction of certain sections of the interceptor system has been necessary to coordinate the interceptor sewer construction with the planning decisions concerning other municipal and Federal facilities which affected it.

The projects which had a major effect on our construction were:

a. Inner Loop Tunnel in the Lincoln Memorial area;

b. Three Sisters Bridge (or alternate) including approach roads; and

c. Redevelopment plans for Bolling Air Force Base and the Anacostia Naval Air Station.

The Inner Loop Tunnel and the Three Sisters Bridge controversies were resolved during the past year by major modifications to the D. C. Freeway Plan and the sections of the interceptor sewer affected by the previous plan are now under construction or will be placed under construction in a few months. Negotiations relating to the redevelopment plans for the Anacostia Naval Air Station area are nearing completion and it should be possible to undertake this construction in the near future.

The completion of Project "C" interceptors, now expected early in 1972, will greatly improve our ability to lessen the impact of overflows to the various streams which occur during wet weather. These interceptor sewers are presently designed to provide for the complete interception of all sanitary sewage along the Potomac above Rock Creek. Flows from 30 to 200 times the average dry weather flow are prevented from discharging from combined sewers to Rock Creek and are carried to the Potomac River pumping station. At this point flows up to five times the average dry weather flow will be pumped to the Water Pollution Control Plant. The interception ratio in the Anacostia Valley is also five times the average dry weather flows.

I am presenting for inclusion by reference in the record a copy of a booklet entitled "Project 'C' - Improvements to the Sewerage System of the Nation's Capital - July 1967" which contains additional information on this project should it be desired. This will provide interesting details for this project for which we do not now have the time.

I am also presenting for inclusion by reference in the records, a copy of our booklet entitled "The Sewerage System of The District of Columbia" which will provide useful background. Of special interest in this booklet is Plate III which shows the area served by our treatment facility. I shall discuss the impact of this large service area later in this statement.

The next item I would like to turn to is

The Potomac Interceptor

The site selection study for what became the Dulles International Airport, published in December

1957, showed the most suitable airport location to be at the head of the Broad Run Watershed which is a tributary to the Potomac near the boundary of Fairfax and Loudoun Counties. Preliminary engineering considerations in that study indicated no economically feasible alternative to a treatment plant capable of accommodating the disposal needs of the airport.

Federal authorities upon receiving this report quickly appreciated the importance of keeping the Potomac free not only of the airport's treated waste, but also of those produced by the great numbers of persons and businesses that would inevitably be attracted to reside or operate in the vicinity of the airport. Although the airport authorization by Congress included provisions for construction of a disposal plant at the site, there followed an intense investigation of alternatives.

In its letter of May 4, 1960 to the Congress the Bureau of the Budget proposed legislation which would provide for:

1. Construction of the Potomac Interceptor for the disposal of sewage from the Dulles International Airport through the D. C. sewerage system and Water Pollution Control Plant;

2. Collection and treatment of sewage from those areas of Maryland and Virginia tributary to the region through which the interceptor would pass;
3. A Federal grant of $3 million for planning rights-of-way acquisition and construction of an interceptor, in part;
4. Treasury loans of $25 million amortized as to principal and interest over forty years; (one half of this amount, by the way, was changed to a grant by PL 90-84)
5. Designation of the D. C. Commissioners to plan, operate and maintain the sewer in cooperation with other jurisdictions; and
6. The creation of a new metropolitan area sanitary sewage works fund of the District of Columbia as a separate and special account through which all receipts from appropriations and revenues from the operation, and all costs of design, construction, maintenance, operation, and amortization would pass.

The total area tributary to the interceptor is 376 square miles; 176 in Maryland and 200 in Virginia. It was estimated that this sewer would serve a total equivalent population of 511,850 in the year 2000, 172,500 in Maryland and 339,350 in Virginia.

The Potomac Interceptor extended only to the District of Columbia boundary. The District's proposed Project "C" interceptor, which I just previously mentioned, had its upper end at the District line with its capacity fully committed for the conveyance of potential flows originating not only in the District, but also from the Little Falls and Cabin John Creek watersheds in Maryland. In addition, on passing Chain Bridge it would receive a large flow increment from Fairfax County, Virginia.

In order to accommodate the waste originating in the Potomac Interceptor area, it was decided to increase the capacity of the Project "C" Interceptor instead of building a special conduit. In view of the substantial increase in the cost of Project "C" to carry the higher flows the Congress extended to the District the privilege of borrowing funds to the extent of $10 million to cover this increase. Moneys for the retirement of this debt would come from users of the Interceptor in Maryland and Virginia.

The completed portions of the sewer were placed in operation in Fiscal Year 1965. The use of the interceptor and the revenues derived therefrom have been less than expected for the first three years of service. This was the result of unexpected deceleration in the home building industry. Some 30,000 persons or their equivalent are estimated to have been served by the interceptor system in 1968 instead of the 97,000 previously forecast for that year. The last segment of the interceptor sewer in Maryland is now under construction.

Turning our attention now to the Combined Sewer Overflows:

The District of Columbia program to separate its combined system sewers into sanitary and stormwater systems was started in 1932 and continued for ten (10) years on a very limited scale, in selected areas, until it was cut-off in 1942 because of World War II. During that 10 year period the District invested less than $410,000 in sewer separation work. In 1958 the program was reactivated, again in selected areas (Rock Creek Valley, Upper Potomac, Washington Channel, etc.) and has continued without interruption since that date on an average cost of about $1.5 million per year. However, the magnitude of the entire project can best be demonstrated by reference to a city-wide sewerage system engineering study report, of the Board of Engineers, date February 28, 1957, in which it was stated that, at 1957 prices, complete separation of the District's combined system sewers would cost over $300 million, with estimated construction time extending well into the next century. It will be seen from reference to Figure II in the booklet I previously mentioned entitled "Sewer Separation Program for Washington, D. C. 1966," that separate sewer systems now serve 68% of the total area within the District of Columbia. As has been indicated estimates made for the cost of completing this project were $300 million. Obviously costs would be considerably higher now. Not only would the cost be overwhelming but the disruption to traffic and normal city functions might be intolerable if accomplished at a pace fast enough to produce significant results even over the next 20 years.

There is also the question of effectiveness. Research over the past decade on the quality of storm water from urban areas indicates increasingly that the storm water runoff from such areas may itself be polluted to such an extent as to require treatment if effective pollution abatement is to be achieved. This fact has caused us to consider the desirability of abandoning this plan in favor of a storage and/or treatment plan. There is a great need for the development of satisfactory methods of dealing with combined sewer overflows for which we hope FWPCA sponsored research will provide the answer. At the present time we are actively cooperating with two FWPCA sponsored research projects on this subject.

One project is based on the containment of all excess flows during the storm periods in a flexible bag in the stream. This does not appear to be a feasible solution in Washington because of the great volumes of waste that would need to be contained, and the anticipation that there would be local objection to a large number of flexible bags in the local water courses during the tourist season.

The other is a demonstration project on economically feasible treatment of storm or combined overflows. While we are hopeful that this project can develop a feasible method of treatment, this solution also would appear to have some shortcomings as it relates to our specific problem. I am referring here to the fact that nearly all of the shore lines of our major streams are park lands under the jurisdiction of the National Park Service. We anticipate that they would resist a location of treatment facilities in the park lands at the points of overflows. We are encouraged, however, by the understanding that this project will develop preliminary data and estimated costs on alternates, such as storage in deep tunnels, a project which is now under consideration by Chicago and I understand a study has been completed in Boston. We shall examine these proposals very closely as well as the results of other research and demonstrations conducted elsewhere. There is no question in my mind but that engineering solutions to these problems can be devised. The major problem will be to find the financial resources to construct the necessary works. No date can be set for the elimination of sewage overflow until the nature and cost of the required construction are known.

In the years since the last conference we have made a number of improvements to our sewer system, in addition to the sewer separation program, which has significantly reduced the amount of overflow to the various watercourses.

For Example:

The overflow relief weir on the Anacostia Main Sewer at Blaine Street was closed off when the Anacostia Force Main and Gravity

Sewer extension to Poplar Point was completed. This closure in July 1963 resulted in the elimination of the daily overflow of raw sanitary sewage to the Anacostia River in the amount of 5.5 MGD, or about 2 billion gallons per year.

With the completion of the Project "C," and this was a double deck sewer, one placed on top of the other, in the vicinity of 27th and G Streets, N.W., the overflow weir on the Rock Creek Main Interceptor Sewer at that location was abandoned in the Spring of 1964. The abandonment of the overflow weir, eliminated daily overflows of raw sewage to the Potomac River which had escalated to approximately 2 billion gallons in 1963.

From the Main Sewerage Pumping Station in the general vicinity of 2nd and N Streets, S.E., a new siphon was added under the Anacostia River to Poplar Point and a new Outfall Relief Sewer constructed from the

Anacostia end of the siphon at Poplar Point to an existing outfall in the vicinity of Howard Road.

The third siphon and new section of outfall sewer, by reducing the overall friction head, has increased the capacity of the sanitary side of the pumping station, which in turn allows a greater portion of the combined sewage entering the station to be pumped to the Water Pollution Control Plant for treatment and a corresponding lesser amount to the Anacostia River. This siphon was put in service as a part of Project "C" in 1961. It is estimated that sanitary pumping capacity of the station was increased by about 13% which resulted in approximately 300 million gallons per year of combined sewage reaching the sewage treatment plant rather than being lost to the Anacostia River.

The Sewer Separation Program itself also has produced significant results. The most dramatic change probably is noted in the Washington Channel. In years past, pollution due to combined system sewage overflows into the Channel was most evident. At the time of the Southwest Redevelopment we undertook to completely separate the sewers in the area. As of today there are no permanent, and only two (2) temporary establishments, that are served by combined system type sewers which overflow to the Channel in times of heavy rainfall.

These are but a few of our accomplishments which I relate to demonstrate that we have been active.

Wastewater Treatment

Since World War II, there has been a continuing effort to upgrade the degree of waste treatment provided by the District of Columbia. To date approximately $25 million have been expended for the Water Pollution Control Plant. The initial facilities to provide secondary treatment were under construction at the time of the previous session of this enforcement conference in 1958. At that time, this Department's representative reported to the conferees that upon the completion of construction the plant was expected to achieve an 80% removal of BOD and suspended solids. This expectation was based upon the report and design basis resulting from a comprehensive study by a board of engineers.

When the completed modified aeration plant was placed in operation, removals of BOD and suspended solids approaching 80% were obtained. However, digestion of the removed solids (sludge) resulted in a product which has proved very difficult to process. A significant part of the material consists of fine particles which will not settle under the dynamic conditions which exist in the settling basins provided for thickening and elutriation. Consequently, these solids are not captured and removed but continue to recycle through the plant until they are eventually lost to the effluent. Such recycling and loss result in overloading of facilities and lower overall plant efficiency.

In November 1962, we reconvened the above Board of Engineers to restudy the situation and to make recommendations. This was done and resulted in the August 1964 report entitled "Planning Study of Sewage Treatment Plant to Year 2000." This report formed the basis for staged plant expansion to provide for predicted increased flows. This phase of the construction program was proceeding according to plan at the time the District adopted stringent water quality standards for the Potomac River in response to Public Law 89-234.

It became apparent during the development of the District's water quality standards for the Potomac River in 1967 that a level of treatment of 80% removal of BOD and suspended solids would be inadequate. The implementation plan which was part of the water quality standards, therefore, proposed to expedite the construction schedule so as to achieve 90% BOD and suspended solids removal within five years at a cost of fifty-two and one-half million dollars based on an Engineering News Record Construction Cost index of 1060.

Following the initial submission of the water quality standards the staff of the Department of Sanitary Engineering began a reexamination of the basic treatment process. In our judgment it became imperative that we anticipate future requirements as much as was humanly possible in order to be sure that anything that we built now would be compatible with future construction. To the uninformed this would seem to be a simple problem of adding more units but unfortunately this is not the case. The basic process which we elect to use must have the inherent ability to achieve the objective and it is generally recognized that the modified aeration process which we now use is not capable under our conditions of achieving levels of treatment beyond present removals.

The initial studies by the staff indicated that a study in depth by highly qualified experts was needed. Therefore, in June 1968 the Department contracted with a panel of nationally recognized wastewater treatment experts to examine its present facilities and its proposed plan for expansion to meet Water Quality Standards. The panel, and I call your attention, Mr. Chairman, to Appendix A which has been submitted, was also required to make recommendations concerning the processes that should be used to assure that the treatment facilities which we build now are sufficiently flexible to permit expansion to achieve the advanced treatment requirements implied in the Secretary's letter.

In order that you might have a full understanding of the scope and nature of the study performed by our consultants, I have asked Dr. Clair N. Sawyer, Vice President and Director of Research for Metcalf & Eddy, a nationally recognized expert on wastewater treatment, to explain to you at this point the studies which his firm and associated consultants have performed, the conclusions, and the recommendations which they have made to us. I should point out at this point that the recommendations are those of the consultants. Although we anticipate that we will concur with the recommended actions there are a number of matters which we must consider and no final decision has been made.

I might also add, Mr. Chairman, that this is the Dr. Sawyer to whom Dr. Bartsch referred yesterday in his very erudite explanation of eutrophication in the waters.

Dr. Sawyer, will you present your statement, please?

STATEMENT OF
DR. CLAIR N. SAWYER
VICE PRESIDENT AND DIRECTOR OF RESEARCH
METCALF & EDDY

DR. SAWYER: Mr. Chairman, Conferees, Ladies and Gentlemen:

I am Clair N. Sawyer, Vice President and Director of Research of Metcalf & Eddy, Consulting Engineers.

Under the terms of our contract with the District, a study has been made and a report prepared in collaboration with Dr. P. H. McGauhey and Professor G. J. Schroepfer, Consultants for the District. The study and report were performed with the following understandings and objectives.

1. Treatment of wastewaters to accomplish 90 percent removal of BOD_5 and suspended solids by 1972.
2. The plant must be flexible enough to permit provision for greater percentage removal of BOD_5 and suspended solids in the future.
3. The plant must be suitable for the addition of foreseeable processes for the removal of phosphorus and nitrogen.
4. The plant must be expandable to accept the average annual flow estimated to occur in the year 2000 or sooner.
5. Existing facilities should be used to the maximum extent consistent with the contractual objectives of the study.

During the course of the study decisions were guided largely by the following physical, regulatory and conceptual constraints.

1. Space available.
2. Competition for additional land area.
3. Concentration factors due to single site.
4. Problems related to logistics, noise, and odors.
5. Anticipated future water quality standards related to recreational use of the Potomac River.
6. Air pollution control.
7. Disposal of wastewater solids.
8. Image of Nation's Capital City.

Primary Treatment

The existing primary facilities are incapable of accommodating flow rates in excess of 300 mgd (million gallons per day) because of hydraulic limitations. Because of this, all flows in excess of 300 mgd rates must, of necessity, be bypassed to the river.

Upon completion of Project "C," it is estimated that the average daily flow to the plant will be 309 mgd by 1980 and 419 mgd by 2000.

The report recommends that the primary treatment facilities be expanded to provide grit removal and sedimentation for all flows from areas served by separate sewers, and for flow rates up to five times the dry-weather flow (DWF) from areas served by combined sewers, or about 939 mgd and 1,194 mgd for the years 1980 and 2000, respectively. Flows from the combined sewer system in excess of 2 DWF, and up to 5 DWF, will receive primary treatment and disinfection with chlorine before discharge to the river. Flows in excess of 5 DWF from the combined system will not receive treatment at the plant.

Sludge Disposal

Present plant processes waste sludges by gravity thickening, single-stage high-rate digestion, elutriation, vacuum filtering and land disposal of the filtered digested sludge. The report recommends that the practice of digestion be abandoned in favor of raw solids dewatering by filtration and final disposal by incineration. The major factors leading to this decision were:

1. Operational problems related to the digestion process.
2. Operational problems and reduction in purification capability related to recycled digested solids.
3. The anticipated increase in activated sludge solids requiring disposal, coincident with required 90 percent BOD_5 and suspended solids capture.

4. The known problems related to anaerobic digestion of sludge mixtures containing large percentages of activated sludge.
5. Diminishing demand for digested sludge.
6. The high capital costs and uncertainty of long term acceptability of ocean disposal.
7. Economics.
8. Release of soluble nitrogen and phosphorus compounds during the digestion process which would accentuate the nutrient problem and make treatment for their removal more costly and less effective.

The proposed plan of sludge processing involves separate, gravity thickening of primary sludges, concentration of activated sludges by air flotation, vacuum filtration of mixed sludges, and incineration. The incinerators will be equipped to meet the requirements of the District's Air Pollution Control Act (1968) and wetted ash will be trucked to an off-site disposal area.

Secondary Treatment

The existing activated sludge treatment facilities were designed to operate either as modified aeration or step aeration systems. The facilities have been operated to date, employing the modified aeration principle with BOD_5 and suspended solids removals ranging somewhat less than the anticipated 80 percent.

The report recommends that the existing units be augmented and that all be operated as step-aeration system to accomplish at least a 90 percent removal of both BOD_5 and suspended solids of all flows from the separate sewer system, and of flows up to 2 DWF from the combined system, or 650 mgd and 910 mgd for the years 1980 and 2000, respectively. Plans also call for disinfection of the plant effluent before discharge to the Potomac River. It also recommends that expansion of the aeration tanks during this initial phase of construction be limited to the maximum capacity required to treat Year 2000 flows by the modified aeration system. The reason for this limitation will be discussed under the subject of Nutrient Removal.

The design of the activated sludge system so as to maintain the proper relationships between aeration tankage, final sedimentation tankage, and return sludge pumping facilities, to say nothing of hydraulics, is an extremely difficult engineering problem for two systems as dissimilar as the modified and step-aeration processes. Since final decisions as to the most appropriate system to employ depends upon nutrient removal considerations, in particular with respect to nitrogen, it is highly desirable that this matter be resolved, once and for all, at as early a date as possible.

Nutrient Removal

The subject of nutrient removal from wastewater creates a new dimension in treatment practice which must be recognized at many locations. Because the effluent from the District's treatment plant discharges into a tidal estuary and because of other known factors, District Officials directed that consideration be given to this matter, with respect to both phosphorus and nitrogen.

In our deliberations it was considered probable that phosphorus removal, to the extent of 90 percent or more would be required in the very near future and that a requirement for nitrogen control would probably be invoked within a few years thereafter. Thus, the problem of incorporating nutrient removal into any proposed scheme of treatment is complicated by the possible need for phosphorus removal alone on an interim basis, until nitrogen removal is required. The uncertainties have made it impossible to select one secondary treatment system, rather, a design involving multiple choice has had to be recommended.

Phosphorus - Two methods of phosphorus removal were considered feasible within the framework of constraints existing at the District's plant. These were:

1. Cationic precipitation of phosphates within some modification of the activated sludge system of treatment.
2. Lime treatment of phosphates in tertiary facilities.

The report recommended that the choice of method for removal of phosphorus be made at the time orders to do so become effective, in order that a better design can be made based upon the anticipated results of active and proposed research pertaining to these matters, at the District and elsewhere. Further, at such time a better assessment of any requirement for nitrogen can be made.

Phosphorus and Nitrogen - In the event that removal of both phosphorus and nitrogen becomes necessary, it will be necessary to operate the activated sludge system so that the majority of the inorganic nitrogen be held in the form of ammonia or be oxidized to nitrates. On the basis of present knowledge, climatic conditions, and physical constraints imposed by the site, it was the consensus of those concerned with the preparation of our report that the most likely system for optimum removals of both nutrients would be as follows:

1. Operation of the activated sludge system utilizing the modified aeration principle, so as to avoid nitrification.
2. Removal of phosphates by lime precipitation following the activated sludge process.
3. Air stripping of ammonia, and
4. Final pH adjustment by recarbonation.

From the above discussion, it is important to recognize the vital part consideration of nitrogen removal has had in our recommendation that the activated sludge system be designed to operate on either the modified or step-aeration principle, in order to cover all contingencies.

Higher Degrees of Treatment

It is conceivable that removals of BOD_5, suspended solids, phosphorus and nitrogen, in excess of anticipated removals by the systems already described, may be required. Experience has shown that significant additional removals of BOD_5 , suspended solids and phosphorus can be obtained by filtration, also some slight improvement in nitrogen removal can be expected. In the event that such facilities are needed, they must be accommodated downstream of all biological treatment and nutrient removal facilities, and in no way will they influence decisions upstream. For this reason, the report does not consider filtration of the final effluent in detail.

It is not anticipated that removal of refractory organic matter and/or reduction of dissolved inorganic solids will ever be required under conditions which exist at the District of Columbia. If such should be the case filtration of all or part of the effluent from any system of treatment employed upstream will be a prerequisite before satisfactory removals of refractory organic or dissolved inorganic matter can be accomplished. Any facilities required, of necessity, will be downstream of the filters.

Costs

The capital costs for facilities to accomplish 90 percent removal BOD_5 and suspended solids with and without nutrient removal are estimated to be as follows:

Capital Costs in Millions of Dollars

	For BOD & SS	For Nutrient Removal		Total	
		Phos.	P & N	with P	with P & N
Initial Development(1)	108	18	110	126	218
Ultimate Development(2)	48	6	40	54	88
Total	156	24	150	180	306

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1. To increase complete treatment capacity to 309 mgd and partial treatment of excess storm flows up to 289 mgd.
2. To increase complete treatment capacity from 309 mgd to 419 mgd.

The annual costs for operation and maintenance excluding amortization of capital costs at the 309 mgd treatment capacity are estimated to be as follows:

BOD and Suspended	
90% Solids removal	$ 7.795 million
with 90% phosphorus removal	14.895 million
with 90% P & N removal	14.645 million

Thank you, Mr. Chairman.

SECRETARY KLEIN: Would you hold Dr. Sawyer available for questions later, please?

MR. JACKSON: Mr. Chairman, Dr. Sawyer and the others here will be available for questioning later.

SECRETARY KLEIN: Fine.

CONTINUED STATEMENT OF
MR. NORMAN E. JACKSON

MR. JACKSON: I would like to continue then with a little further discussion of the District of Columbia's water pollution control plans.

The District of Columbia's water pollution control facility, shown on Figure 9-1 from the consultant's report, is truly a regional facility. As a result of a policy of cooperation with other jurisdictions in the metropolitan area developed many years ago, the District's water pollution control facility is intended (by the year 2000) to provide service for a tributary area of 725 square miles -- an area more than ten times its own size. This has been a rapidly growing area, particularly in the suburban jurisdictions and there are indications that growth will continue for some time. A recent study for the Metropolitan Washington Council of Governments, as yet unpublished, shows that the population in the metropolitan area increased 31% from 1960 to 1967. The projections in this same report for the year 2000 indicate a probable population several times the population at present. These overwhelming projections and their sanitary implications are causing us to reexamine our present policy of accepting all wastes which other jurisdictions send us for treatment. This reexamination is further justified in view of the more stringent water quality standards which eventually may require effluents of quality equal to if not better than the receiving stream itself.

We would like to continue our policy of cooperation but have a most critical space problem that must be solved if we are to do so, particularly in the expectation of advanced waste treatment requirements. The present site of the District's water pollution control facility is adequate to provide advanced waste treatment for 419 MGD, but will not be adequate to provide similar treatment to ultimate flows from suburban areas currently served by the District's plant. The Army Corps of Engineers has given tentative approval to a District of Columbia proposal to reclaim 51 acres of the Potomac River Mud Flats adjacent to the Water Pollution Control Plant site subject to the approval of the Department of the Interior.

We have requested such approval from the Department of the Interior but have been advised that a public meeting to discuss the implications of the change to the Potomac River Shore Line must be held prior to approval. Figure 9-1 shows the area we have asked to reclaim and the use we would make of it.

You will note from Table I that at the present time about 50% of the wastes receiving treatment at our facility have an origin outside our boundaries. This proportion is expected to increase since the population in the suburban area is projected to grow significantly while that in the District itself is expected to be reasonably stable. Thus we see that a decision concerning the regional nature of our plant must be made quickly because it will have a considerable impact on the extent of our construction in the next few years.

In the early efforts to protect the local streams and the Potomac River it was determined that the District of Columbia's treatment facilities should be developed to serve other jurisdictions in the metropolitan area desiring such service. This resulted in agreements with Maryland and Virginia communities to provide such service.

The new water quality standards and the District's serious land shortage require that this policy be reexamined. If a very high degree of treatment is to be required for discharges into the Potomac then it does not appear to be economically feasible to transport wastes long distances to the District of Columbia's Water Pollution Control Plant. The wastes could be given the same degree of treatment near their origin and discharged to nearby water courses or reused locally.

For example, the Washington Suburban Sanitary Commission now discharges wastewaters from the Upper Anacostia area down the Anacostia River Valley to our plant. The trunk sewer is now inadequate due to the very rapid growth in Prince George's County and proposals have been submitted to construct a new 96-inch force main from Peace Cross near Bladensburg, Maryland, to the D. C. Water Pollution Control Plant at a cost of approximately $19 million. Assuming that W.S.S.C. can construct and operate an advanced waste treatment facility as cheaply as we can, and there is no reason to believe that they cannot, it would appear logical to abandon the plans for the construction of the force main and construct a treatment facility in the Bladensburg area to discharge into the Upper Anacostia River. The long term savings might be considerable, and the discharge of high quality effluent into the Anacostia River might improve the river quality considerably.

Research

Recognizing that improved treatment was necessary, and that treatment methods which proved successful elsewhere do not always achieve expected results here, the District has undertaken an active research program to guide it in the design and operation of its facilities. This program has been conducted in cooperation with the Federal Water Pollution Control Administration and has been financially aided by grants from that agency. And you saw the results yesterday I think quite dramatically in Dr. Stephan's report which I believe was based largely at the water pollution control pilot plant.

Last year we undertook an investigation to determine the effectiveness of raw wastewater flocculation as a method of increasing the solids capture. This plant scale investigation indicated that the use of polyelectrolytes could not be expected to be as successful here as they were reported to be elsewhere.

We are also actively cooperating with the

FWPCA in a research project to determine the cost-performance relationships of advanced waste treatment for nutrient removal. A 100,000 gallon per day pilot plant was constructed at the District's Water Pollution Control Plant and is now in operation. This research is expected to continue until July 1971.

At the present time we are constructing a biological pilot treatment facility utilizing conventional units. This facility will have two major functions: first, it will provide a controlled input to the advanced waste treatment project just mentioned; and second, it will provide a facility for the investigation of operational, process or structural modifications, that may serve to increase the effectiveness of the existing units.

Our research program will continue as long as it provides us with some of the answers we desperately need in the construction and operation of our treatment facility.

Mr. Chairman, you mentioned a little bit earlier and raised the question of continuing research in the sense that it might serve to delay. My remarks here I think will be primarily with respect to what we consider a long needed research program for a fundamental understanding of the estuary, and this has been, I think, needed for a considerable number of years.

Need for Estuary Studies

In 1964, the District of Columbia (Department of Sanitary Engineering) and the State of Maryland (State Health Department) cooperated in the financing of an investigation by an expert panel of scientists associated with Johns Hopkins University to determine what studies were necessary to achieve an adequate understanding of the inter-reactions within this very complex body of water. It was our feeling at that time, and that of the Regional Sanitary Advisory Board of the Washington Metropolitan Council of Governments, that such an understanding was essential to the design of treatment facilities which would achieve the objective of a clean estuary.

Since that time the Federal Water Pollution Control Administration has undertaken comprehensive studies of Chesapeake Bay which included a limited research program along the general lines recommended by the panel of scientists. The Regional Sanitary Advisory Board was of the opinion, however, that such studies should be enlarged and intensified at the earliest possible date so that metropolitan Washington officials could proceed with the planning and design of facilities with the assurance that the expenditures which they must make to effect water pollution control programs will succeed in correcting the pollution problem. Of special need is scientific information on the factors that stimulate algae growths. Their concern resulted in the adoption of a resolution at the February 10, 1969, meeting of the Board recommending that its parent body, the Metropolitan Washington Council of Governments, strongly urge the Secretary of the Interior to enlarge and intensify the studies of the Potomac Estuary. This action was taken by the COG Board of Directors on March 13, 1969. A copy of this resolution is attached to this statement for your information.

Flow Augmentation

As all of you today are probably painfully aware, the flow in the Potomac River varies widely and this has a significant impact on the quality of water in the estuary. The average annual flow is more than ample to support the population growth in the basin, yet in 1966, the metropolitan area narrowly avoided a serious water shortage when the flow was so low that almost all of it was needed for public water supply. Of course, during such periods very little flow is available for water quality control.

A plan has been devised to provide storage during periods of excess flow with releases during the dry season but controversy concerning the location of storage reservoirs has interfered with the implementation of the plan. Modified plans have been proposed which if implemented should provide sufficient flows to satisfy public water supply needs, but very little attention is being given to the provision of flows adequate to the maintenance of water quality in the estuary. It should be made clear that I am not speaking of flow augmentation, Mr. Chairman, as a substitute for adequate treatment, but rather as a necessary supplement to such treatment. A review of the transcript from the previous conference shows that the conferees were expecting flow augmentation which would result in a minimum flow past Washington for water quality control of 1,000 cubic feet per second. It must also be kept in mind that the population projections at that time were considerably lower than those at present.

The value of the river flows on water quality has been questioned and reference is often made to the 1962 report of Abel Wolman and John C. Geyer, which stated that there did not seem to be any apparent change until the flow reached 4000 to 5000 cubic feet per second. It should also be noted that these same authorities stated, and I quote, that "The effect of river flows on the quality of water in the upper estuary is so interrelated with all other effects -- that only a very hazy and uncertain picture is apparent." This would seem to underline the need for estuary studies just discussed. Since flow augmentation might be of significant value, I am hopeful that the matter of low flow augmentation for quality improvement will receive serious reexamination by the Federal Government in the above studies.

Any discussion at this time must include fiscal resources, to which I now address your attention.

Fiscal Resources

The fiscal resources available to the District of Columbia are another major problem. When the original Water Quality Standards were submitted in June 1967, we estimated the cost of treatment facilities to obtain those standards at fifty-two and one-half million dollars. As a result of the necessity to make basic process changes and other improvements recommended by our consultants and reviewed for you a few moments ago, the cost of conventional secondary treatment necessary to achieve the removal of 90% BOD and suspended solids from 309 MGD is now estimated to be $108 million (that is at an Engineering News Record Construction Index of 1440). At the time of the adoption of the District's Water Quality Standards we pointed out that our ability to construct the required improvements was dependent upon appropriations by Congress. We assumed, in the assessment of our capability to build the facilities necessary to meet the standards, that Federal sewage treatment constructions grants would be available in the amounts authorized in the Federal Water Pollution Control Act. The unavailability of sewage treatment construction grants as authorized in the Clean Water Restoration Act of 1966, has seriously upset our fiscal planning. It will be noted from Table 2, that although the District would qualify for considerably more, Federal construction grants under PL 660 have only accounted for about 19% of our total costs since the beginning of the Federal program. The deficiency created by this lack of grant funds must somehow be remedied.

Acting in good faith the Department has recommended that the District seek Congressional approval of increased loan authority and an increase in the District's water and sewer service rates. The requested increase, when combined with construction grants and revenue from other jurisdictions, would have been adequate to finance the construction and operation of facilities anticipated in the water quality standards, but now the request must be amended upwards to reflect the more stringent requirements.

Your attention is now invited to Table 3 which contains a summary analysis of estimated costs. It will be noted that the costs in 1968 were $38 per million gallons. It also shows that the increased size and complexity of the proposed facility will result in an estimated operating cost of $69 per million gallons. This cost does not include any cost for amortization of the facilities. The cost for amortizing facilities alone (that is, at remaining loans on existing plant plus $108 million at 5-1/8% for 30 years) amounts to $69 per million gallons. Thus the total cost of operation and amortization is approximately $138 per million gallons.

Our consultants estimate that the additional facilities for phosphorus removal from 309 MGD will cost $18 million and that the cost of operation would increase $7 million per year. This increased operations cost would nearly all be required for chemicals. This would be an added cost of about $73 per million gallons. Thus if we provide 90% removal of BOD, suspended solids, and phosphates our total cost would be in the neighborhood of $210 per million gallons including the cost of amortization.

If we provide both phosphorus and nitrogen removal tertiary treatment facilities must be constructed estimated to cost $110 million. The operation of this tertiary treatment process would be about $6,650,000 per year. This would add approximately $122 per million gallons to the cost of $138 per million gallons for BOD removal or a total of approximately $260 per million gallons including amortization of the facilities.

The magnitude of these costs are such that it will be extremely difficult to finance the required construction from service charges alone. It is also apparent that the District's allotment of Federal sewage treatment construction grant appropriations will be inadequate to cover the 55% grants authorized even if appropriations are made at the authorized amounts. Thus, the full achievement of our objective would appear to be dependent upon special Federal grants to the District for this purpose or special loan authority which would place the financing within the District's grasp.

Summary

In summary I would like to repeat that it is the Department's objective to provide the best treatment attainable for the wastewaters of the District of Columbia consistent with achieving approved water quality criteria, a feasible technology, and the appropriations necessary to plan, construct, and operate the facilities required for implementing that objective. We recognize that there are some very difficult problems to which we must address ourselves if we are to succeed in achieving this objective. I would like to reiterate some of these problems in closing

1. As public officials we must be able to assure citizens that what we propose to do will meet the need. Serious consideration should be given to enlarging and intensifying the scientific research on the Potomac Estuary at the earliest possible date.
2. There is a need for the development of satisfactory methods of dealing with combined sewer overflows which can be achieved within our economic resources.
3. The District of Columbia's role as a service agent to the metropolitan area jurisdictions

in the matter of waste treatment needs to be reexamined.

4. The difficult financing problem must be solved. There is serious doubt whether the citizens of the District of Columbia have the financial resources to support advanced waste treatment through sewer service charges even with available Federal grants. Since this is the National City and a considerable part of the problem results from this fact, will the Federal Government favorably consider a special grant to the District to support advanced waste treatment?

Given the necessary technological answers and the necessary fiscal resources you can depend upon us to do our part in achieving clean waters for the Potomac Estuary.

Thank you.

(The following documents were submitted by Mr. Jackson for inclusion in the record.)

APPENDIX A

PANEL OF ENGINEERS

PROCESS STUDIES - WASHINGTON, D. C.

Harrison P. Eddy, Jr.	Partner	Metcalf & Eddy
John S. Bethel, Jr.	"	" "
Dean F. Coburn	"	" "
Clair N. Sawyer	Vice Pres. and Dir. of Research	" "
Donald E. Schwinn	Project Engineer	" "
Robert H. Lubker	" "	" "

Dr. P. H. McGauhey - Professor and Director of Sanitary Engineering Research Laboratory, University of California

Dr. George J. Schroepfer - Professor and Sanitary Engineer - University of Minnesota, Institute of Technology

Paul V. Freese - Deputy Director, Department of Sanitary Engineering District of Columbia Government

George J. Moorehead - Chief, Systems Planning Division
Department of Sanitary Engineering
District of Columbia Government

TABLE 1

PAST AND PROJECTED SEWAGE FLOWS AT DISTRICT OF COLUMBIA WATER POLLUTION CONTROL PLANT SHOWING ORIGIN

Year	Average Flow in Million Gallons/Day				Percent of Total		
	Total	Area of Origin					
		D.C.	MD.	VA.	D.C.	MD.	VA.
1959	168	119	49		70%	30%	
1960	175	120	56		68	32	
1961	168	112	56		66	34	
1962	181	117	62	2	64	35	1%
1963	182	116	63	3	63	35	2
1964	199	116	78	5	58	39	3
1965	202	112	85	5	55	42	3
1966	211	119	85	7	56	41	3
1967	219	109	103	7	50	47	3
1968	231	122	101	8	53	43	4
1969	234	118	106	10	50	45	5
1970*	244	120	110	14	49	45	6
1980*	332	136	164	32	41	49	10
1990*	480	150	254	76	31	52	17
2000*	630	170	333	130	27	53	20

*Projection based upon unpublished 1969 Population Studies and Forcasts by Hammer, Greene, Siler Associates (High Projection).

TABLE 2

GRANTS UNDER PL 89-660

WPC-DC No.	Project Description	Total Cost Dollars	Federal Grant Amount
1	Unit 22-First Half Secondary Treatment	6,810,007	250,000
2	Screens and Sluice Gates, Main Sewerage Pumping Station	309,165	91,379
3	Interceptor, 3rd and O Sts., S. W. and Southwest Sewage Pumping Station - Sections 1, 2, and 3	2,399,300	250,000
4	Unit 23-Second Half Secondary Treatment	2,425,116	250,000
5	Unit 24-Sludge Handling Facilities	2,229,915	250,000
6	Collection and Treatment Facilities Lorton, Virginia	635,648	190,695
7	Sewer and Syphon Glenn Dale, Maryland	94,739	25,146
8	Anacostia River Syphon and Outfall	826,823	248,047
9	Potomac River Pumping Station, Connections, and Upper Potomac Interceptor Relief to Vicinity of Potomac St., N. W., Georgetown	5,415,080	250,000

WPC-DC No	Project Description	Total Cost Dollars	Federal Grant Amount
10	Aeration Tank No. 4 and Final Settling Tanks Nos. 10 and 12	1,535,000	423,638
11	Joint East Side Interceptor Relief (D. C.) and Anacostia River Trunk Sewer (WSSC)	2,679,000	600,000
12	Potomac River Force Mains - Vicinity of Overlook Avenue and Chesapeake St., S. W. to Potomac River Pumping Station, Vicinity of Theodore Roosevelt Island Bridge	8,265,700	600,000
13	Sludge Thickening Tank and Seawall	537,000	134,419
14	Unit 2B - Bypass Conduit and Locker Building	433,000	103,952
15	Interceptor in Maine Avenue, S.W. between 6th and M Sts., S. W. and 11th and G Sts., S. W.	238,000	65,316
16	Upper Potomac Interceptor Relief Foundry Branch to District Line	3,472,000	600,000

WPC-DC No.	Project Description	Total Cost Dollars	Federal Grant Amount
17	East Side Interceptor Relief, Pumping Station, & Force Main	1,750,000	517,590
18	Upper Potomac Interceptor Relief vicinity of Potomac St., N. W., Georgetown to Foundry Branch	3,086,000	600,000
19	Outfall Sanitary Relief Sewer - Water Pollution Control Plant to vicinity of Overlook Avenue and Chesapeake St., S. W.	3,704,000	669,840
20	Additional Pumping Facilities, Overflow Conduits and Preliminary Tanks	5,360,000	1,403,702
21	Additional Sludge Handling Facilities	8,306,000	2,299,000
	TOTAL	60,511,413	9,822,724

TABLE 3

ANNUAL COSTS FOR OPERATION AND MAINTENANCE at 309 MGD

1968	
Total Costs	$3,214,000
Total Flow (232 MGD x 365 days)	84,680 MG
Cost per M. G.	$ 38
Estimated Cost New Facility (90% Rem BOD and SS for 309 MGD)	
Personnel Services	$3,218,900
Materials and Supplies	542,200
Chemicals	1,432,200
Fuel	302,100
Electric Power	823,600
Maintenance and Repair	1,349,900
Miscellaneous	126,100
Total	$7,795,000
Total Flow (309 MGD x 365 days)	112,785 MG
Cost per M. G.	$ 69
Amortization of Facilities - Annual Cost	
Remaining Loans on Present Facilities	$ 726,330
Plant Expansion (90% BOD & SS only) (5-1/8% @ 30 yrs.)	$7,063,200
Total	$7,789,530

Amortization Cost per M. G.
\$7.789,530 ÷ 112,785 M. G. = \$ 69

Thus Total Cost of Treatment
per M. G. (\$69 + 69) = 138

METROPOLITAN WASHINGTON COUNCIL OF GOVERNMENTS

REGIONAL SANITARY ADVISORY BOARD

RESOLUTION ENCOURAGING THE ENLARGEMENT AND INTENSIFICATION OF STUDIES OF THE POTOMAC ESTUARY.

WHEREAS, the technical staffs of the local jurisdictions in the Washington metropolitan area have long recognized that the Potomac Estuary is a very complex body of water and that its use for the disposal of cleansed waste water and all other desired uses of this water resource should be based upon a full understanding of the reaction of that body of water to the waste loads and other demands made upon it, and;

WHEREAS, the District of Columbia (Department of Sanitary Engineering) and the State of Maryland (State Health Department) cooperated in May 1964 in the financing of an investigation by an expert panel of scientists associated with Johns Hopkins University to define what should be studied and how the work should be done, that investigation and study having been coordinated with the Regional Sanitary Advisory Board, and;

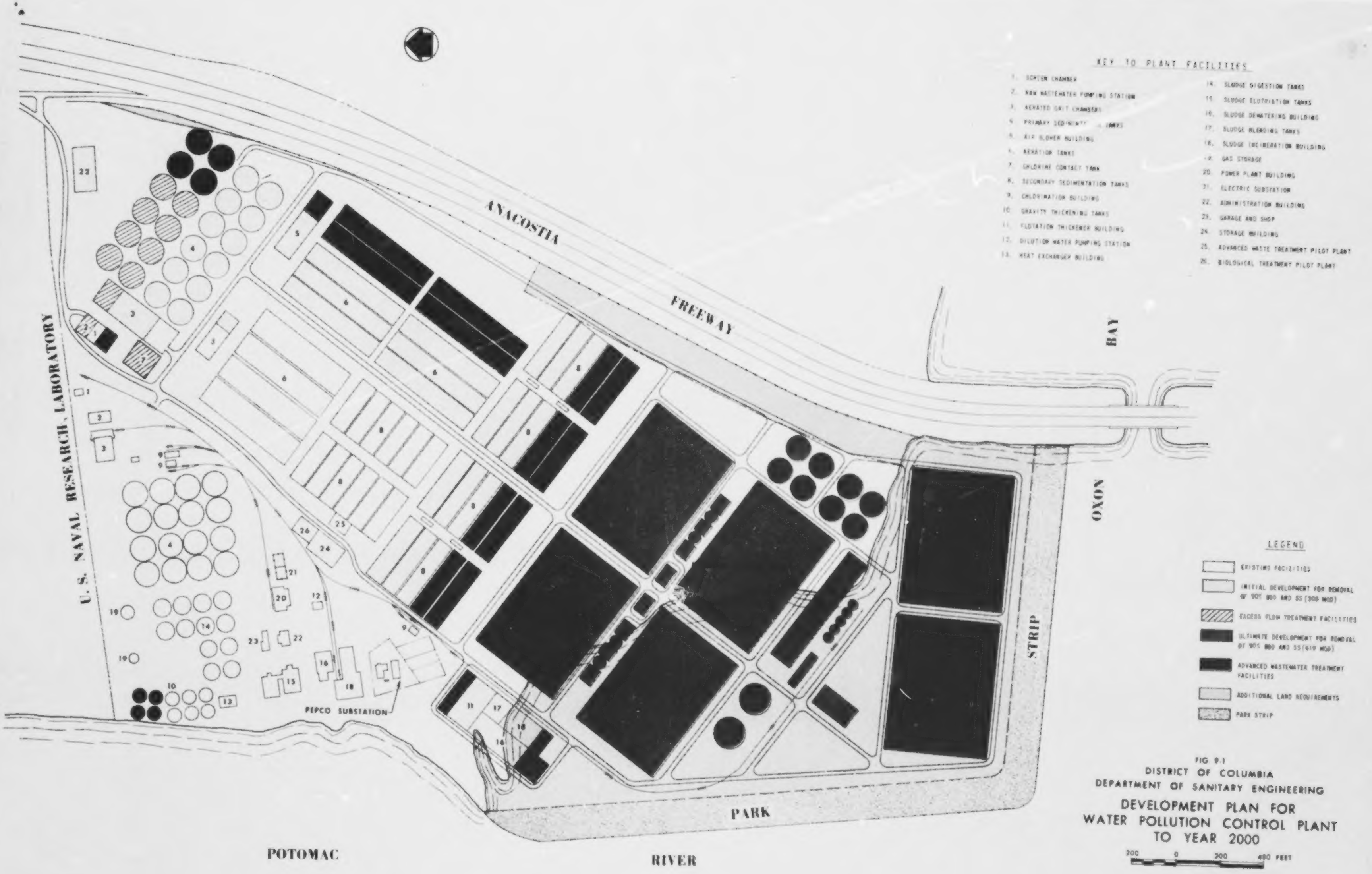
WHEREAS, the panel of scientists have outlined a comprehensive research program ("A Research Program For the Potomac River", November 15, 1965) which can be reasonably expected to provide the desparately needed information if implemented in its entirety, and;

WHEREAS, the Federal Water Pollution Control Administration has undertaken a limited research program along the general lines recommended by the panel of scientists, and;

WHEREAS, a meaningful comprehensive program for water pollution control cannot be developed without a thorough understanding of the complex physical, chemical, and biological interactions within the Potomac estuary;

NOW THEREFORE BE IT RESOLVED, that the Regional Sanitary Advisory Board recommends that the Metropolitan Washington Council of Governments strongly urge the Secretary of the Interior to enlarge and intensify the studies of the Potomac Estuary as recommended in the aforementioned report of the panel of scientists so that metropolitan Washington officials can proceed with the planning and design of facilities with the assurance that the expenditures which they must make to effect water pollution control programs will succeed in correcting pollution problems.

Approved by RSAB
2-10-69


KEY TO PLANT FACILITIES
1. SCREEN CHAMBER
2. RAW WASTEWATER PUMPING STATION
3. AERATED GRIT CHAMBERS
4. PRIMARY SEDIMENT TANKS
5. AIR BLOWER BUILDING
6. AERATION TANKS
7. CHLORINE CONTACT TANK
8. SECONDARY SEDIMENTATION TANKS
9. CHLORINATION BUILDING
10. GRAVITY THICKENING TANKS
11. FLOTATION THICKENER BUILDING
12. DILUTION WATER PUMPING STATION
13. HEAT EXCHANGER BUILDING
14. SLUDGE DIGESTION TANKS
15. SLUDGE ELUTRIATION TANKS
16. SLUDGE DEWATERING BUILDING
17. SLUDGE BLENDING TANKS
18. SLUDGE INCINERATION BUILDING
19. GAS STORAGE
20. POWER PLANT BUILDING
21. ELECTRIC SUBSTATION
22. ADMINISTRATION BUILDING
23. GARAGE AND SHOP
24. STORAGE BUILDING
25. ADVANCED WASTE TREATMENT PILOT PLANT
26. BIOLOGICAL TREATMENT PILOT PLANT
LEGEND
EXISTING FACILITIES
INITIAL DEVELOPMENT FOR REMOVAL OF 90% BOD AND SS (300 MGD)
EXCESS FLOW TREATMENT FACILITIES
ULTIMATE DEVELOPMENT FOR REMOVAL OF 90% BOD AND SS (419 MGD)
ADVANCED WASTEWATER TREATMENT FACILITIES
ADDITIONAL LAND REQUIREMENTS
PARK STRIP
ANACOSTIA FREEWAY
BAY
OXON
STRIP
PARK
RIVER
POTOMAC
U. S. NAVAL RESEARCH LABORATORY
PEPCO SUBSTATION
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200 0 200 400 FEET

FIG 9.1
DISTRICT OF COLUMBIA
DEPARTMENT OF SANITARY ENGINEERING
DEVELOPMENT PLAN FOR
WATER POLLUTION CONTROL PLANT
TO YEAR 2000

1969
METCALF & EDDY
ENGINEERS
BOSTON NEW YORK PALO ALTO CINCINNATI

Project C

IMPROVEMENTS TO THE
SEWERAGE SYSTEM OF THE
NATION'S CAPITAL

DISTRICT OF COLUMBIA GOVERNMENT
DEPARTMENT OF SANITARY ENGINEERING

"We hope to make the Potomac a model of beauty and recreation for the entire country. . . ."

President Lyndon B. Johnson
State of the Union Message. January 4, 1965

"The river rich in history and memory which flows by our Nation's Capital should serve as a model of scenic and recreation values for the entire country. . . . I hope action here will stimulate and inspire similar efforts by State and local governments on other urban rivers and waterfronts. . . . They are potentially the greatest single source of pleasure for those who live in most of our metropolitan areas."

President Johnson
Message on Natural Beauty. February 8, 1965

This booklet was prepared by the
GOVERNMENT OF THE DISTRICT OF COLUMBIA:
DEPARTMENT OF SANITARY ENGINEERING

JULY 1967

CONTENTS

A MARK OF CIVILIZATION
The centuries-old practice of disposing of untreated wastes in the nearest waterway is no longer good enough. Project C is designed to give added protection to the waters of the Nation's Capital as the population grows. 5

A MODEL OF CONSERVATION
Project C's system of giant interceptor sewers will help reach President Johnson's goal of making the Potomac River Basin a model of conservation for the Nation. 7

AN UNWHOLESOME WIND
A century ago, the city's wastes clogged the tidal flats, posing a serious threat to the health of Washington's inhabitants. Since then, steady progress has been made toward a more adequate sewer and sewage treatment system. 10

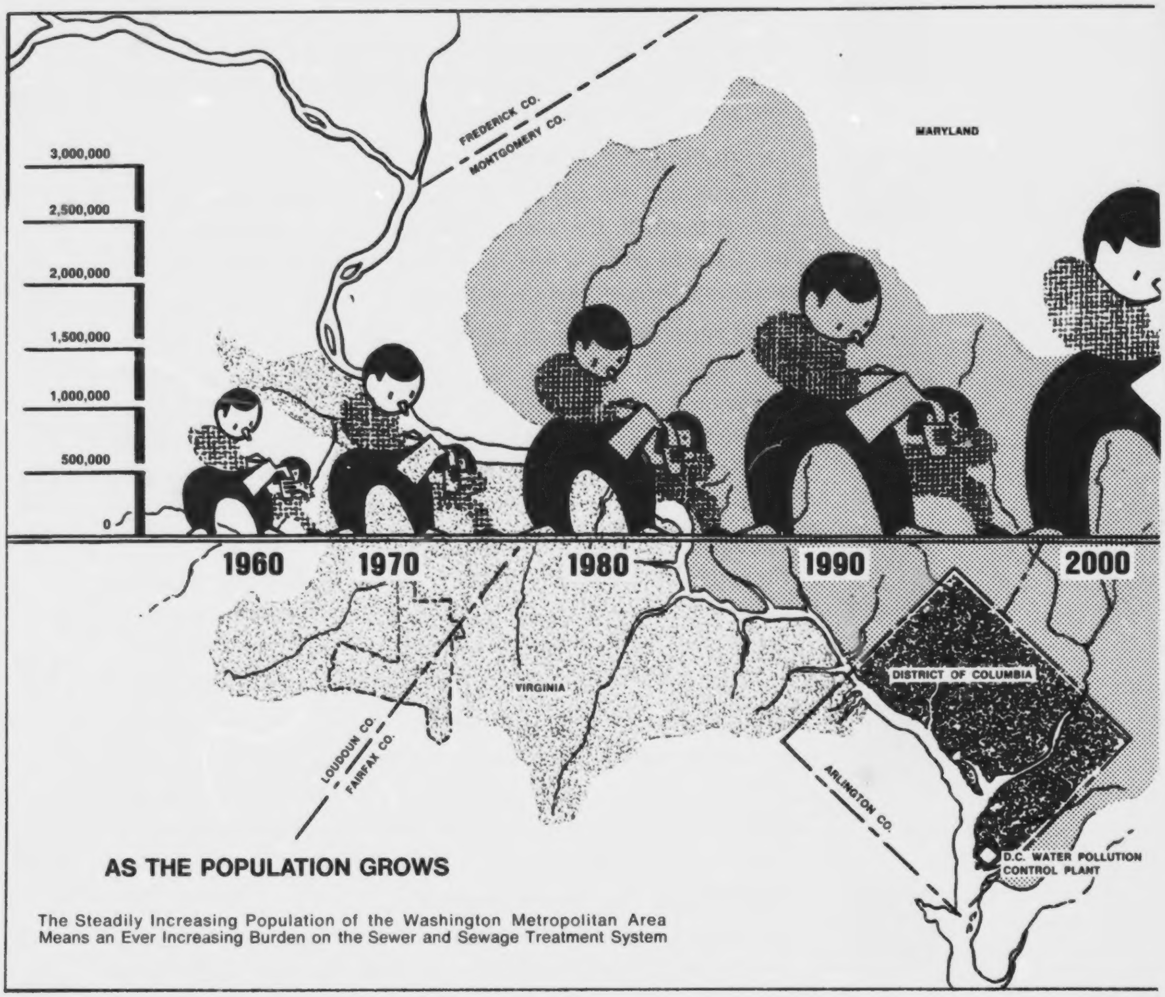
BLUEPRINT FOR THE FUTURE
In 1957, a Board of Engineers completed a three-year study with a plan for improvements in the city's sewer system to meet the needs of a growing population into the 21st Century. A modified version of the consultants' Project C was adopted as a key element in the improvement program. 14

PROJECT C—A PROTECTIVE BARRIER
The interceptor sewers of Project C are designed as an invisible barrier to protect the Potomac, the Anacostia and Rock Creek. Twin-barrel and double-deck conduits, automated pumping stations and siphons under the rivers all play their part in the system. 17

WHAT HAPPENS WHEN IT RAINS?
An inch of rain from a summer thundershower drops 1.2 billion gallons of water on the District of Columbia. Within minutes, the city's sewer system may be called upon to do more work than it does in a normal day. 23

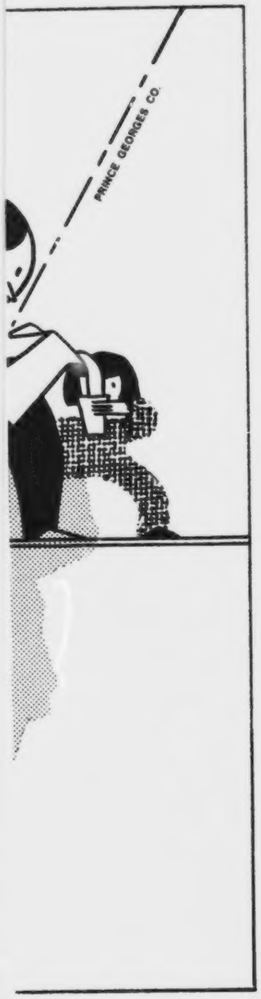
PRESERVING THE ENVIRONMENT
Special care was taken in design and construction of Project C to avoid anything that would detract from the city's historic and natural beauty. 28

APPENDIX
Basic design data for Project C was spelled out in the 1957 report of the Board of Engineers. 29



AS THE POPULATION GROWS

The Steadily Increasing Population of the Washington Metropolitan Area Means an Ever Increasing Burden on the Sewer and Sewage Treatment System


PRINCE GEORGES CO.

A Mark of Civilization

Since man first began to live in cities, at least 6,000 years ago, a distinguishing mark of civilization has been his ability to provide himself with fresh, reasonably potable water. The giant water supply works of the Romans are still visible throughout Europe and similar works have been unearthed in the Middle East, giving evidence of far older civilizations.

Less visible, and usually much less efficient, were the means these earlier civilizations used to dispose of the contaminated water and their other wastes. Still, the Romans found ways to pollute the Tiber and those who dwelt in the castles of medieval Europe frequently managed to befoul their moats.

It was not until relatively recent times that the invention of the water closet made possible the water-borne disposal of wastes on any systematic or widespread basis. But it has become increasingly apparent throughout the United States that even this relatively sophisticated method of carrying wastes off to the nearest waterway is no longer acceptable.

HIGH DEGREE OF TREATMENT PROVIDED

Under growing public pressure to end water pollution, city after city has begun improving its sewer and sewage treatment systems to reduce the deliberate or accidental overflow of sewage and to give a high degree of treatment to the wastes that must be disposed of in the waterways.

A major effort in the city of Washington to deal with this problem is Project C, a system of large interceptor sewers and modern pumping plants.

In many American cities the effort to prevent water pollution is complicated by a rapidly rising number of people—people who cannot live safely and comfortably in a community that has not met and solved its pollution problems.

In few American communities has the rise of population been so spectacular as in the Washington Metropolitan area, as the accompanying map indicates. Each additional resident, man, woman or child, is a user—and polluter—of water—an estimated average of 65 gallons a day per person for domestic and personal use. To this are added large quantities for industrial and business establishments.

MAJOR FOUR-PRONGED ATTACK

It is in the context of this rapidly expanding population—and increasing public pressure to end pollution—that the District of Columbia, in cooperation with the Federal Government and the neighboring communities of Maryland and Northern Virginia, has embarked on a major, four-pronged attack on water pollution, an attack which has already begun to show impressive results.

The four fronts in the attack are the Potomac Interceptor Sewer, which will prevent sewage pollution of the Potomac immediately above Washington by the rapidly growing residential and commercial areas on both sides of the river; the Sewer Separation Program in older parts of the District; improvement of the District's Water Pollution Control Plant at Blue Plains; and the subject of this pamphlet—Project C.

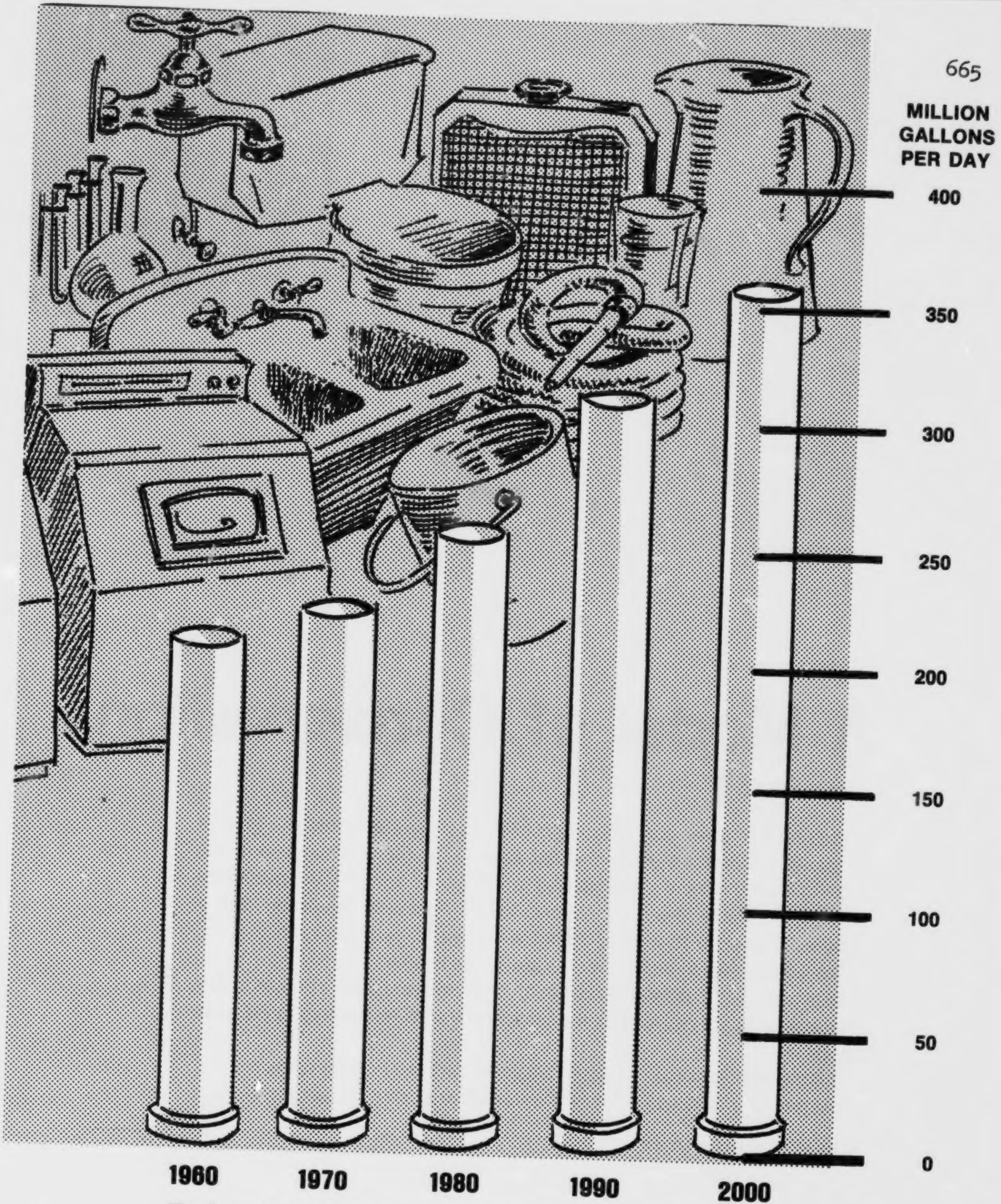
A Model of Conservation

At few other times and places in history has there occurred the kind of accelerating population growth that has been felt in the area surrounding the Nation's Capital since the beginning of World War II. And with the population growth came problems out of proportion to the increase in population itself—problems that seem to grow by a kind of mathematical progression.

The sewer systems serving the area are a case in point.

To provide for the increased population, it would seem to be a simple matter of extending sewer lines out into the suburbs and hooking them up to the existing system.

But the existing system has itself been overwhelmed in many cases not only by the growth in population but by the loads placed on it by garbage disposal



The Annual Average Volume of Sewage From Separate and Combined Systems Receiving Complete Treatment at Blue Plains Is Expected to Increase Steadily.

units, dishwashing machines, automatic clothes washers and the proliferation of water-using air conditioning units.

DESIGNED FOR RAPID DILUTION

Some of the older sewers in the city of Washington, for example, were designed so that they would overflow a few times a year during storms into rain-swollen streams where the escaping sewage would be quickly diluted. But the discharge of air conditioning water—unheard of when the sewers were designed—had, by the early 1950's, begun to cause a number of the sewers to overflow regularly during the summer months into virtually dry streambeds.

Another persistent problem has been in trying to connect the larger new sewers of the suburbs, designed with the rapidly increasing population in view, to the smaller, older sewers of the District system.

The answer to problems such as these has been Project C—a system of interceptor sewers big enough to carry the sewage from the suburbs safely through the city to the Blue Plains Water Pollution Control Plant and big enough to handle the new loads put on them by air conditioning, washing machines and the other water-using devices of modern civilization.

Planning for this broadscale effort to reduce the pollution of the Potomac River and its tributaries in the vicinity of the Nation's Capital began in the mid-1950's and construction actually began on Project C in 1960—well before Lyndon B. Johnson announced, in his 1965 State of the Union Message, his intention of making the Potomac River Basin a "model of conservation" for the Nation.

To reach the President's goal will involve the efforts not only of the District of Columbia and the Federal Government, but also of the states of Maryland, Virginia, West Virginia and Pennsylvania—an effort on a much vaster scale than Project C and the other local works related to it.

But Project C which is designed to help keep the Potomac clean as it flows past Washington by drastically reducing the amount of sewage escaping into the river, should fit into plans for the broader program as though it had been tailored specifically for that purpose.

An Unwholesome Wind

By almost any standards, the primitive sewage disposal system of the city of Washington a century ago was appalling. The results were described in this account in the Washington Evening Star of February 10, 1887, when the effort to clean up the filth-laden tidal flats was already underway:

> *"Washington has a population of nearly a quarter of a million. Before this important work was undertaken, every one of this vast number daily breathed an atmosphere laden with the noxious gases which were generated from the unwholesome river flats when the wind was from that quarter. The sewerage of about the entire city was deposited upon the flats in such a manner that its deadly poison returned daily to endanger the lives and health of the people."*

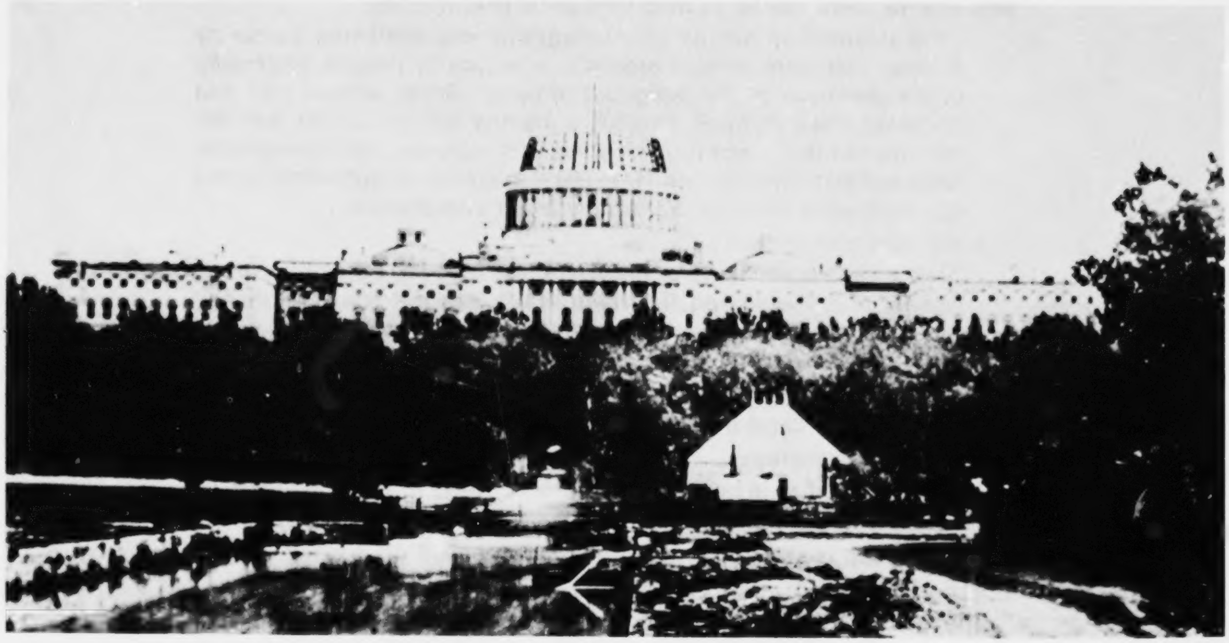
Until 1872, the central part of the District of Columbia was drained by the odious Washington City Canal, which had been completed in 1815.

Designed as a transportation channel through the city, and as an extension of the C & O Canal, the City Canal ran from the Potomac River near the foot of 17th Street along what is now Constitution Avenue, crossed in front of the Capitol and then down Canal Street to the Anacostia River at the foot of New Jersey Avenue. It became a common practice to discharge sewage and refuse into the canal and it was, understandably, a source of constant annoyance to the busy capital during the years of the Civil War.

OUTLET NEAR WHITE HOUSE

Actually, the canal helped to solve some problems that had been even more annoying a few years before. Up until 1850, the sewers from the public buildings near the White House had their outlet on public grounds a short distance south of the White House, where the flow stagnated and made a marsh. In the following year, the sewers were extended down 17th Street and into the canal. Sewers from the Post Office and Patent Office Buildings (on F Street

continued



In 1859, the dome of the Capitol was beginning to rise above the Old City Canal, described by newspapers of the time as a "fetid bayou filled with floating dead cats, all kinds of putridity, and reeking with pestilential odors." National Park Service Photo.

between Seventh and Ninth Street) crossed Ninth Street and emptied into a branch of Tiber Creek, which flowed southward between Ninth and Tenth Streets and was still uncovered except at the streets which crossed it.

In his "A History of the National Capital," Vol. II, Wilhelmus Bogart Bryan tells how the canal formed a ravine through parts of the city.

> *"The sidewalk as well as the carriageway was continued across by bridges that were without siderails, a source of danger, especially in the darkness of the unlighted streets," Bryan writes. "On one occasion when Philip R. Fendall, a leading member of the bar, fell into the ravine . . . and broke his leg in two places, the* Intelligencer *declared that it was due either to the negligence or parsimony of the city authorities that this crossing was left unprotected. . . ."*

And a little later he says:

> *"Ten blocks to the north of the White House in the Commons, in the vicinity of Fifteenth and R Streets, N.W., was the place of deposit for the night soil that was hauled there each day by the city government without expense to the householder."*

By the time the Civil War started, the drainage of at least a third of the city flowed into the City Canal through sewers originally provided to carry off storm water and surface drainage.

The canal was filled in by the Board of Public Works in 1872 and replaced by the "Old B Street Sewer," which discharged into the Potomac just west of 17th Street and is still in use as a storm-water conduit discharging into the Tidal Basin.

The need for an adequate sewer system had been increasingly apparent since a municipal water supply was introduced in 1859. By 1874, the city had 80 miles of sewers, carrying both sewage and storm water to the Potomac. It was not, however, until after 1890 that construction began on a comprehensive system of sewers for the entire city.

ROCK CREEK VALLEY PROTECTED

Like that in almost all other major cities (among them Boston, Chicago, Louisville, New York and Philadelphia) the sewer system in the older sections of Washington carries both sewage and storm water in the same pipes. At the time, this seemed by far the most practical and certainly the most economical way to build a sewer system since there was no treatment plant and both sewage and storm water ended up in the river anyway.

670

The Hering-Gray-Stearns Report of 1890, on which construction of the present comprehensive system was based, saw no reason to abandon the existing economical combined system but proposed a modification in the Rock Creek Valley, where it was felt that the sewers should be protected from silt which would enter the storm drain from expected street grading and house building.

Engineers who studied the system for the District in 1898, 1914 and 1918 all agreed that the combined system was suitable for the areas it served. However, beginning in the 1890's, the separate system method was generally adopted for new areas.

By 1929, building separate systems in new areas was common, but the problem of separating storm and sanitary sewers was emphasized by John Blake Gordon, then the Sanitary Engineer of the District, who said that an attempt should be made to break away from the combined system wherever possible. But he added:

> *"To divorce stormwater and sanitary sewage in the District would involve time, money and inconvenience to such an extent as to stagger the imagination. Due further to the fact that by removing all stormwater overflows (of combined sewers) and by the installation of a sewage treatment works, pollution would only be removed from the immediate vicinity of the city, it would seem fatuous to expend many millions of dollars to accomplish this purification when the river immediately above and below would be subject to contamination by other contributing communities."*

Reports of consultants in 1933 and 1935 recommended separation of the existing combined systems in small areas of the city and work was started in Potomac Heights in 1934, the Luzon Valley area in 1936 and the Klingle Road area in 1938.

It was not until 1954, however, that a responsible public body—in this case, the Interstate Commission on the Potomac River Basin—urged the adoption of a long-range plan for elimination of all combined sewers as part of an effort to clean up the entire Potomac.

It was in the same year that the District retained as a board of engineers three of the Nation's leading experts on the subject, Frank A. Marston of Boston, Samuel A. Greeley of Chicago, and Gustav J. Requardt of Baltimore to make a comprehensive study that led to the decision to go ahead with what is now known as Project C.

Blueprint for the Future

The Board of Engineers retained to study the District's sewer system and recommend improvements to meet the needs of the rapidly growing metropolitan area reported its findings in a 228-page book on February 28, 1957.

There were three ways the District could attack the problem, they said, and they labeled these three approaches as "Project A," "Project B" and "Project C."

The approach they recommended was "Project C" and it is a modified version of that approach which was adopted. But a brief review of the other two approaches is helpful in understanding why they settled on Project C—and why Project C was modified before construction started.

> *"Complaints of citizens, newspaper articles, and statements of qualified spokesmen were to the unanimous effect that something should be done to prevent the continued pollution of the Potomac and Anacostia Rivers and especially the pollution of the waters of Rock Creek," they reported. "Demands reached the ulti-*

Before construction could begin, numerous test holes were bored.

> *mate that no sewage of a human or industrial nature be allowed to enter the waterways and that all sewage be conveyed to the treatment plant at Blue Plains and there be properly disposed of."*

Project A would have accomplished this purpose—at a cost estimated in 1957 dollars at $238 million.

CONVERSION OF ALL SEWERS

It would have involved the conversion of all existing combined sewer systems into separate systems by adding complete new systems, either sanitary or storm, depending on the capacity and depth of the old ones, throughout 15,000 acres of the older part of the city—and cost, the Board found, would not be the only objection.

> *"This project," they wrote, "would be the most painful to adopt, in that many miles of trenches and tunnels in the heart of the District would impede foot and wheel traffic, there would be substantial loss of business to merchants while sewer construction was underway, and the resultant noise, dust and mud would inconvenience citizens for many years in the future."*

The Project A approach would have required 20 construction crews working full time for 20 years—and the benefits of the work would not be felt until the end of that time.

Project B, which was also rejected, would have cost $93 million in 1957 dollars and would have caused much less pain and inconvenience than the more ambitious Project A. It would have involved separation of storm and sanitary sewers in a relatively small section of the city and the construction of new sewer mains and pumping plants so that the amount of sewage that had to be diverted into the rivers would be highly diluted.

PROJECT B LESS EFFECTIVE

But Project B, the Board decided, would actually be less effective than Project C even though it would cost more.

As recommended by the Board, Project C would have involved separation of storm and sanitary sewers in a larger area of the city than in Project B and would have reduced pollution of the Potomac upstream from Rock Creek just as effectively as the much more expensive Project A. They estimated Project C would cost about $72 million in 1957 dollars.

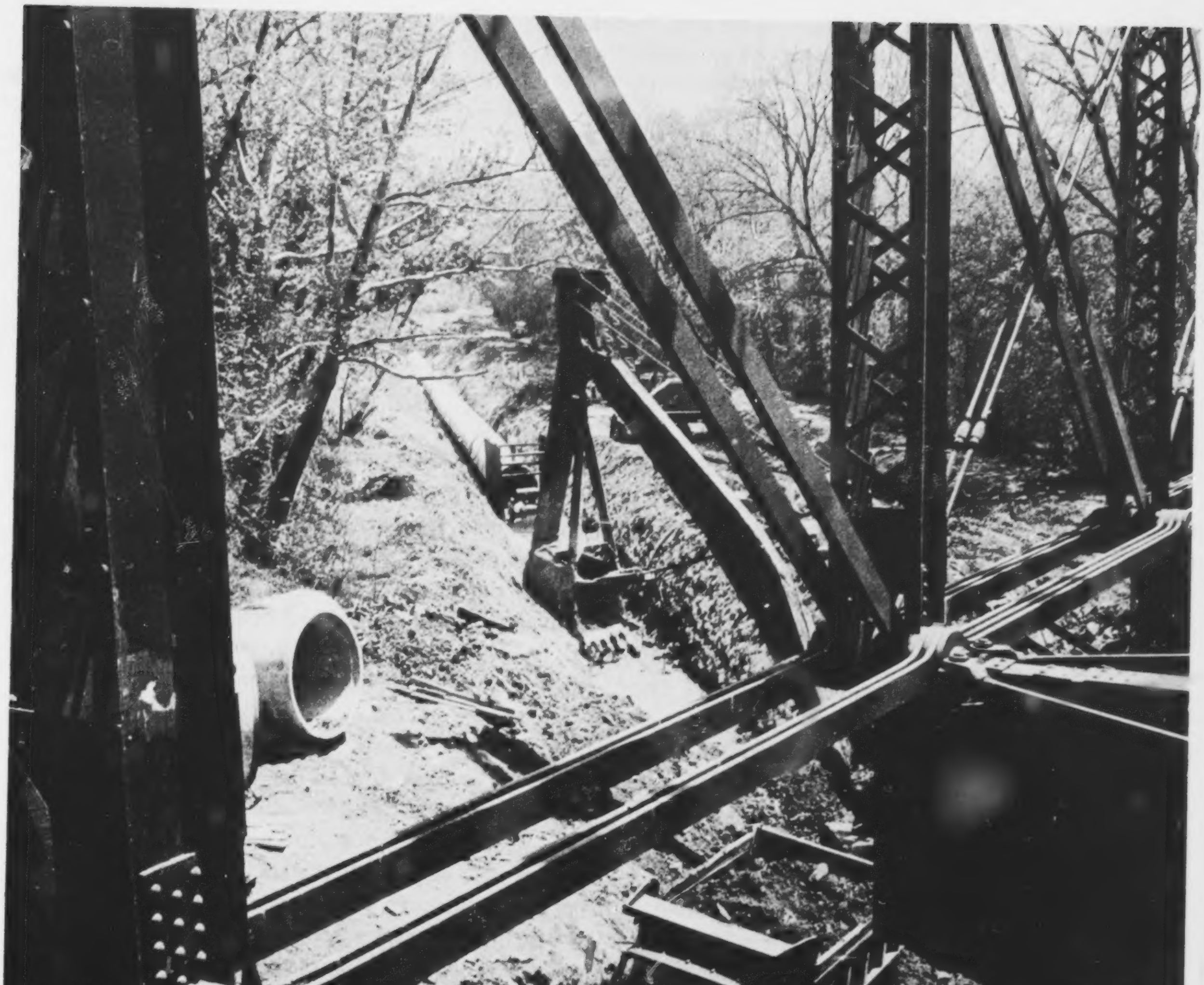
Before construction began on Project C, however, it was modified in some respects by the District's Department of Sanitary Engineering, resulting in improvements and in a significantly different cost figure.

A significant change was the decision not to build a special conduit from Piney Branch to the Potomac. It was felt that the limited benefits of the conduit would not justify the cost (nearly $14 million) or the great destruction of trees and disruption of the stream bed required for construction.

Other important effects of the modification were to split off the sewer separation project into a separate program and to build the major interceptor sewers in two pipelines rather than one.

The result of this modification will be that Project C will accomplish much of the aim of Project A at less cost and with much less inconvenience to the life of the city.

Trusses of the railroad bridge at Arizona Avenue frame construction work in the bed of the C & O Canal.



PROJECT C

A Protective Barrier

The huge interceptor sewers of Project C can be thought of as a kind of invisible wall, providing a protective barrier between the city of Washington and the major streams that flow through it—the Potomac and Anacostia Rivers and Rock Creek.

From the District's northwestern boundary to the Blue Plains Water Pollution Control Plant below the city, the sewer mains of Project C divide the city and its wastes from the current of the Potomac.

At its upper end, this line is connected to the Potomac Interceptor Sewer, which extends a similar kind of protection on both sides of the river as far away as the new Dulles International Airport in Virginia and to Seneca Creek in Maryland.

Protection is also provided to the south bank of the Anacostia River by new sewer lines joined to those of the Washington Suburban Sanitary Commission, which serves Montgomery and Prince Georges Counties in Maryland.

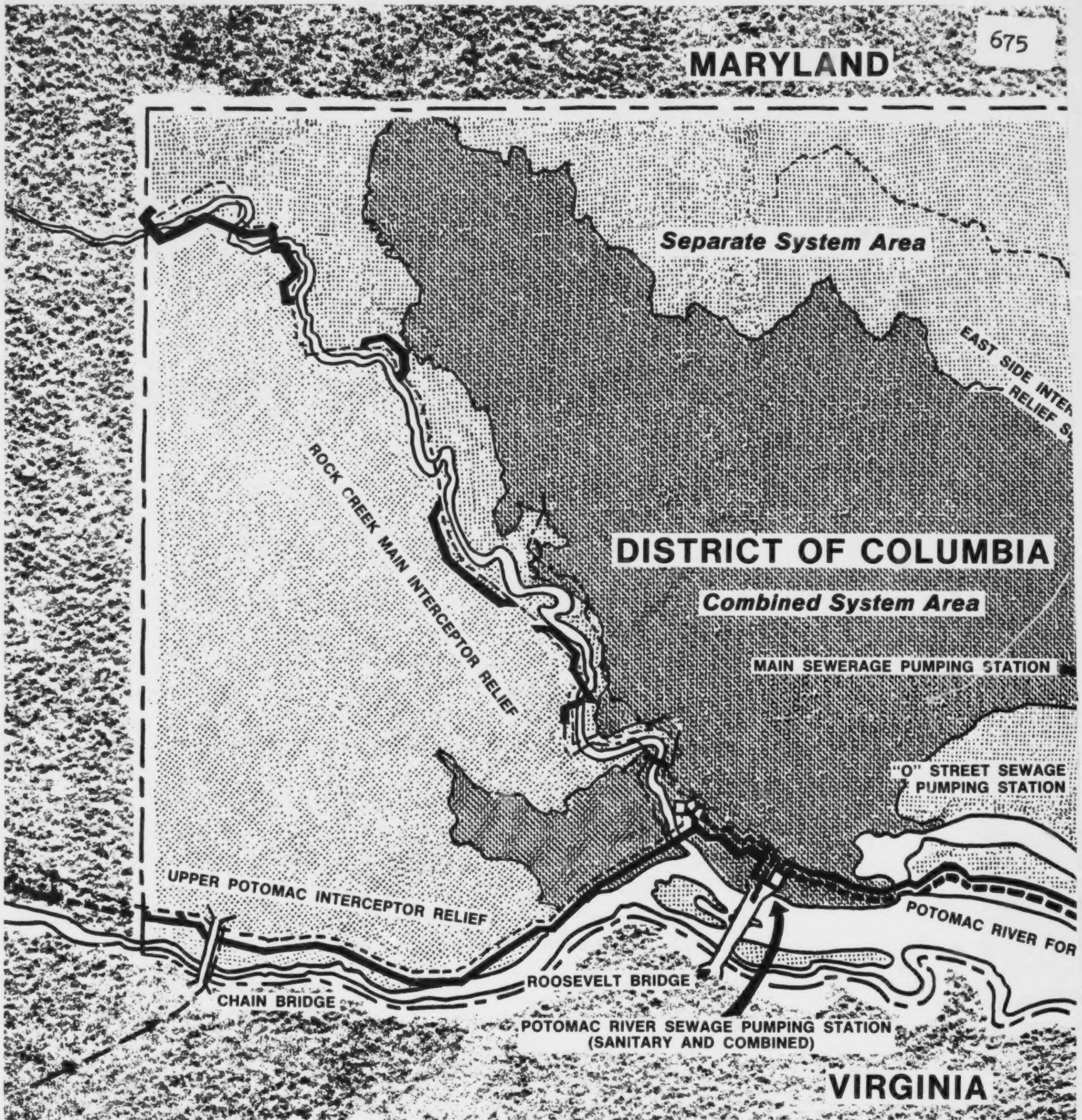
The third major segment of Project C involves the improvement of the interceptor sewers which have been constructed in the Rock Creek Valley initially in keeping with the recommendations of the Hering-Gray-Stearns Report of 1890.

POTOMAC HAD CAPACITY

At the time the 1890 report was written, it was felt that the Potomac had sufficient capacity, and the amount of sewage produced by the city was small enough, so that the sewage could be safely discharged into the river. But Rock Creek, wandering as it does through the city's major park, needed protection. For this reason, the 8½-mile Rock Creek Main Interceptor (1900's) and two shorter diversion sewers, (1930's) one on each side of the creek, were built to keep most of the sewage out of the creek and, instead, discharge the overflow into the Potomac at the mouth of Rock Creek.

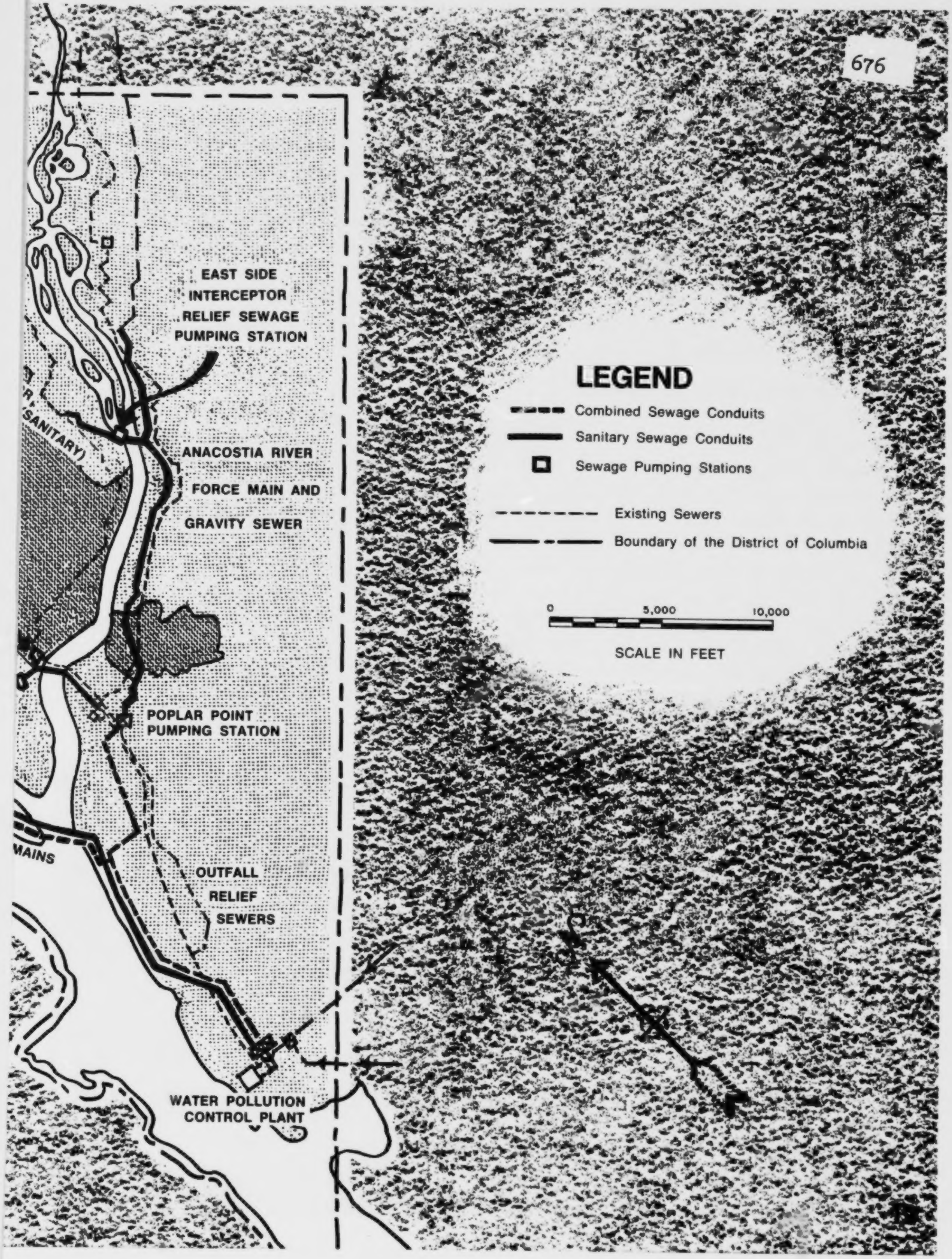
But the capacity of the sewers designed to protect the creek has long since

continued


MARYLAND
Separate System Area
EAST SIDE INTER
RELIEF S
ROCK CREEK MAIN INTERCEPTOR RELIEF
DISTRICT OF COLUMBIA
Combined System Area
MAIN SEWERAGE PUMPING STATION
"O" STREET SEWAGE PUMPING STATION
UPPER POTOMAC INTERCEPTOR RELIEF
POTOMAC RIVER FOR
ROOSEVELT BRIDGE
CHAIN BRIDGE
POTOMAC RIVER SEWAGE PUMPING STATION (SANITARY AND COMBINED)
VIRGINIA

PROJECT C

Map of System Area


EAST SIDE INTERCEPTOR RELIEF SEWAGE PUMPING STATION
(SANITARY)
ANACOSTIA RIVER FORCE MAIN AND GRAVITY SEWER
POPLAR POINT PUMPING STATION
MAINS
OUTFALL RELIEF SEWERS
WATER POLLUTION CONTROL PLANT
LEGEND
Combined Sewage Conduits
Sanitary Sewage Conduits
Sewage Pumping Stations
Existing Sewers
Boundary of the District of Columbia
0
5,000
10,000
SCALE IN FEET

Custom-built, 96-inch diameter conduit was used for the Upper Potomac Interceptor Relief in the bed of the C & O Canal.

been outstripped by the area's increase in population and the vastly increased use of water. When the lines were built, no one could have known that the bucolic Montgomery County countryside would one day be covered by suburban homes, apartment towers and large shopping centers—or that the sewers would have to handle wastes from as far away as the Atomic Energy Commission headquarters at Germantown or the new Bureau of Standards complex at Gaithersburg.

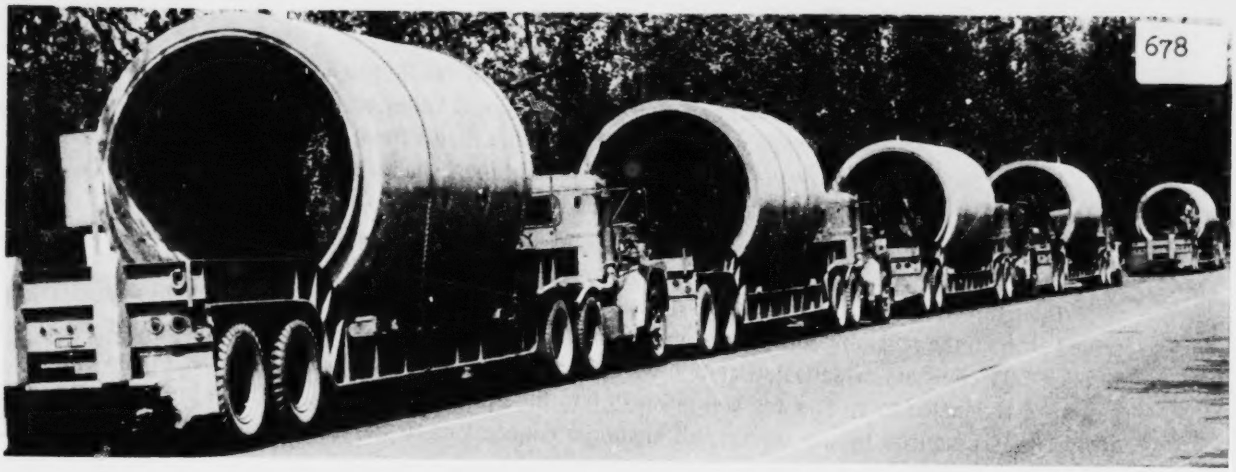
By the mid-1950's, the capacity of the Rock Creek Main Interceptor system to protect the creek had become so inadequate that signs were posted along the stream warning the residents of the city that it was dangerous to wade in the water.

STORM WATERS USED FOR DILUTION

The amount of protection provided to a stream by an interceptor sewer is measured by what the engineers refer to as the "dilution factor"—the number of times the average annual dry weather flow of sanitary sewage will be diluted by storm water before the sewer will overflow.

The goal of Project C as it affects Rock Creek is to provide a dilution factor of from 30 to 200 along the Creek between the Potomac and Piney Branch. The remaining upper section is in separate system areas. This means the sewers designed to protect the creek will overflow only after the sanitary sewage has been diluted a minimum of 30 times by storm water. It was estimated that overflow from the huge Piney Branch area would happen only once every two years on the average and that it would occur only when the stream was swollen with storm waters that would immediately increase the dilution even more.

The 4½-mile-long Upper Potomac Relief Interceptor Sewer along the Potomac from the District line down to Foundry Branch is through separate system areas and between Foundry



Branch and Rock Creek, it is designed to overflow into the Potomac only after the sanitary sewage has been diluted 30 times with storm water.

> *"A factor of 30 appeared to be the highest justifiable in view of the greater cost of the relief interceptors designed for the higher dilution factors," the Greeley-Marston-Requardt Report said. "Use of a fairly high dilution factor is considered desirable in this vicinity because of the possibility of cleaning up the adjacent portion of the river so that it might be suitable for certain recreational uses."*

From the Theodore Roosevelt Bridge south along the Potomac and along the Anacostia, the dilution factor was further reduced so that combined sanitary and storm sewage diluted more than five times will be diverted into the river. The Board of Engineers explained the reasoning behind this decision in these words.

> *"Along the Potomac River downstream of (the pumping station) and along the Anacostia River, it is considered that for Project C a dilution factor of five is the highest that is justifiable economically, since the rivers in these areas are often sluggish and are twice daily subject to the upstream movement of polluting material by the tides. It is not deemed economically practicable to make this portion of the water area as suitable for recreation as the area along the Potomac River farther upstream."*

POTOMAC RIVER SEWAGE PUMPING STATION

The Potomac Pumping Station, hidden away under the D. C. approach to the Theodore Roosevelt Bridge, is thus a key element in Project C because it is at this point that combined sewage dilutions in excess of 5-to-1 are diverted through an outflow pipe into the center of the river where the effluent will be quickly diluted further by the river water.

It is also important because it marks the first point at which sanitary sewage coming from as far upstream as Dulles International Airport does not run downhill in a low-cost gravity system. From the pumping station, the sewage is pushed nearly four miles downstream through force mains on its way to Blue Plains because the land along the river is too flat to permit gravity flow.

The East Side Interceptor Relief Pumping Station was hidden underground in a corner of the D. C. Stadium parking lot.

When the station is in full operation, five giant pumps will handle the flow from Georgetown and the area upstream along the Potomac, from the Rock Creek Valley and from much of downtown Washington, moving it silently underground to the Blue Plains Plant.

As the sewage reaches the pumping station, it flows through heavy steel grates designed to protect the pumps from large timbers, oil drums and other unusual objects that somehow find their way into the sewage system. From a long well, which extends from 15 feet above sea level to 21 feet below, the sewage is then channeled by automatic gates to the pumps.

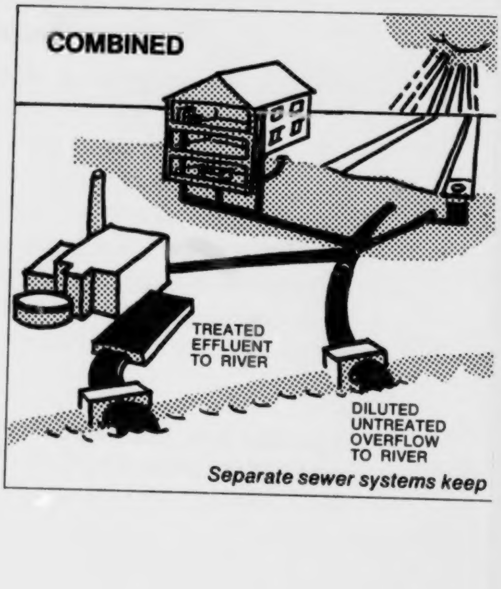
The room containing the well and the gates—known as the screen and rack room—is tightly sealed off from the adjoining room containing the pumps. Gases rising from the well are pumped through 594 canisters of activated carbon which removes 95 percent of the odors before the gases are channeled to an areaway and released into the atmosphere. Because of the presence of the gases produced by the sewage, all electrical connections in the screen and rack room are explosion proof.

Most of the elaborate electrical apparatus for the pumping station is housed in the adjoining pump room, however, where the gases from the sewage cannot intrude. The station receives power on 13,800-volt feeders and then reduces it through transformers to 4,160 volts. Three separate power sources provide insurance against a loss of power. But if there should be a total failure such as the Northeast blackout of November 9, 1965, a small propane engine would switch on and produce enough electricity to operate lights and close the gates to protect the pumps.

This large, well-lighted room is probably one of the most comfortable places in the city of Washington, especially during the hot, sticky summer months. To protect the complicated electrical control equipment, the temperature is carefully maintained at an even 74 degrees and the humidity is held down to 30 percent.

Sitting at a large control panel which looks at first glance as though it had been designed for use at Cape Kennedy rather than in a sewage pumping station, one man can monitor the operation of the station. But the plant is so highly automated that, when it is completely equipped,

continued


COMBINED
TREATED EFFLUENT TO RIVER
DILUTED UNTREATED OVERFLOW TO RIVER

Separate sewer systems keep

680

What Happens When It Rains?

During a normal summer day, the District of Columbia uses roughly 190 million gallons of Potomac River water and then sends most of it, laden with a heavy burden of wastes, coursing down the sewer mains to the Water Pollution Control Plant at Blue Plains.

But what happens when it rains?

Even a moderately heavy rainstorm increases by many fold the amount of water that has to be disposed of in a short period of time.

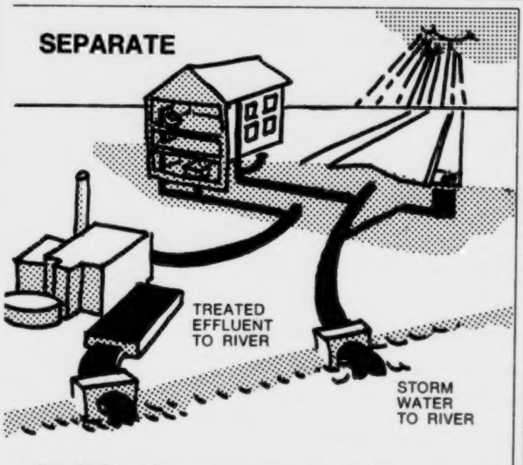
An inch of rain, falling uniformly over the 44,000 acres of the District, amounts to 1.2 billion gallons of water. Of this amount, about half evaporates, is taken up by the surface soil or seeps down to the sub-surface rocks.

The other 600 million gallons—several times more water than the city uses for all purposes on a normal day—has to be disposed of through the sewer system. And sometimes, during a heavy summer shower, it has to be disposed of in a very short time. The city's sewer system may thus be called upon to do more work within an hour or two than it normally does in an entire day.

In the newer two-thirds of the city, the sanitary sewers, which carry away household, industrial and commercial wastes, are separate from the storm sewers, which carry the high volume of rain water.

But in the older third of the city, the storm and sanitary sewers are combined. If an interceptor sewer in a combined system area is not adequate to carry the combined load, it will overflow, dumping raw sewage, diluted by the storm water, into the streams.

One of the major purposes of Project C is to retain a large fraction of this mixture of sewage and storm water in the system and to make sure that, if there is to be an overflow, it will be highly diluted in the system and delivered to a point where it will do the least harm.



untreated sanitary sewage out of the rivers.

it will be possible to leave it entirely unmanned. Instead, a closed-circuit television camera will scan the control board and transmit a picture to the Main Sewerage Pumping Station near the Naval Gun Factory where the staff on duty there can act if an emergency arises.

The pumping station is designed, however, to adjust itself to the variations in the flow of the sewage—and to protect itself in case of trouble.

Each of the five 100 million-gallon-a-day rated pumps has its center line 8½ feet below sea level. Above that rises a three-story-high complex of motors and magnetic drives.

At the top of each is a 500 horsepower electrical motor turning at a constant speed of 232 revolutions per minute. This motor is connected to the pump by a magnetic drive. If the flow of sewage is low, the drive slips, supplying just enough power to enable the pump to keep the sewage moving. If the flow increases, the drive automatically causes the pump to turn faster.

If the flow increases even further, a 1,250 horsepower motor takes over and turns the pump at a constant speed of 327 rpm. The two pumps have a combined capacity of 148 million gallons a day. Three other pumps are designed to be driven at 360 rpm by 1,750 horsepower motors and to have a combined capacity of 318 million gallons a day.

The station is designed so that the sanitary and dry-weather combined sewage flow can be mingled together and the mixed flow can be channeled through any pump or combination of pumps if this should be desirable at any time.

In normal operation the two flows are kept separate so that three of the pumps will be handling only the sanitary sewage and the other two the combined sewage flow.

If, for any reason, the flow to one of the pumps is cut off, it acts automatically to protect itself. Two gates on the downstream side close automatically, thus preventing sewage from forcing itself back upstream through the pump, and the motor turns itself off. The gates must be reopened in the proper order before the pump will resume operations.

Other modern pumping stations in the Project C program are located near the Naval Gun Factory and in an underground location in a far corner of the D.C. Stadium parking lot to pump the sewage through siphons under the Anacostia River.

TWO-STORY AND PARALLEL LINES

When Project C was first proposed in the Greeley-Marston-Requardt Report of 1957, the plan was to have a single large pipe running along the shore of the Potomac. Before detailed designs were started, however, this was modified in a significant way.

From the District line, the Upper Potomac Interceptor Relief consists of a single conduit which is 8 feet in diameter for most of its length but is 7 feet in diameter for part of the way. It runs 4½ miles to a point near 27th and K Streets N.W.

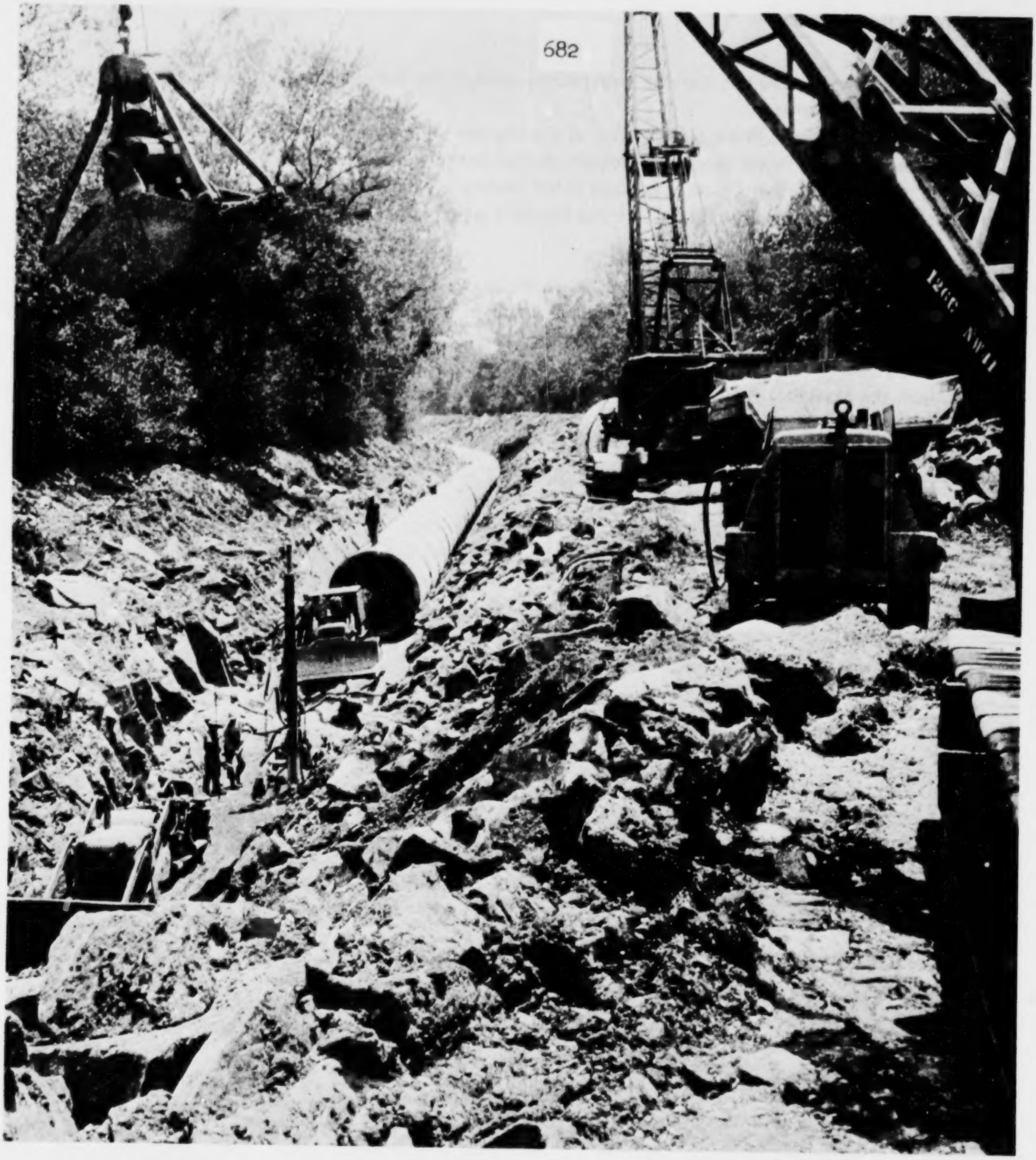
It is joined in that vicinity by the flow from the Rock Creek Valley and together they run in a two-story conduit 3,700 feet to the Potomac Pumping Station.

Downstream from the pumping station, the Force Main conduits are laid side-by-side. One is six feet in diameter, the other eight feet.

One obvious reason for dividing the line in two was to prevent a complete breakdown of the system in case of trouble. If there were only a single line, an emergency could cause it to be shut down completely. But with two lines, the chances of having to close down the entire system were greatly reduced.

The modification had another—and, from the long-range standpoint, even more important—purpose. By building two lines, it would be possible, right from the beginning, to separate the

continued



After the conduit had been hidden under the canal bed, both the canal and its towpaths were in better condition than when they were built.

flow of sewage—one line carrying only sanitary sewage and the other carrying combined storm and sanitary sewage.

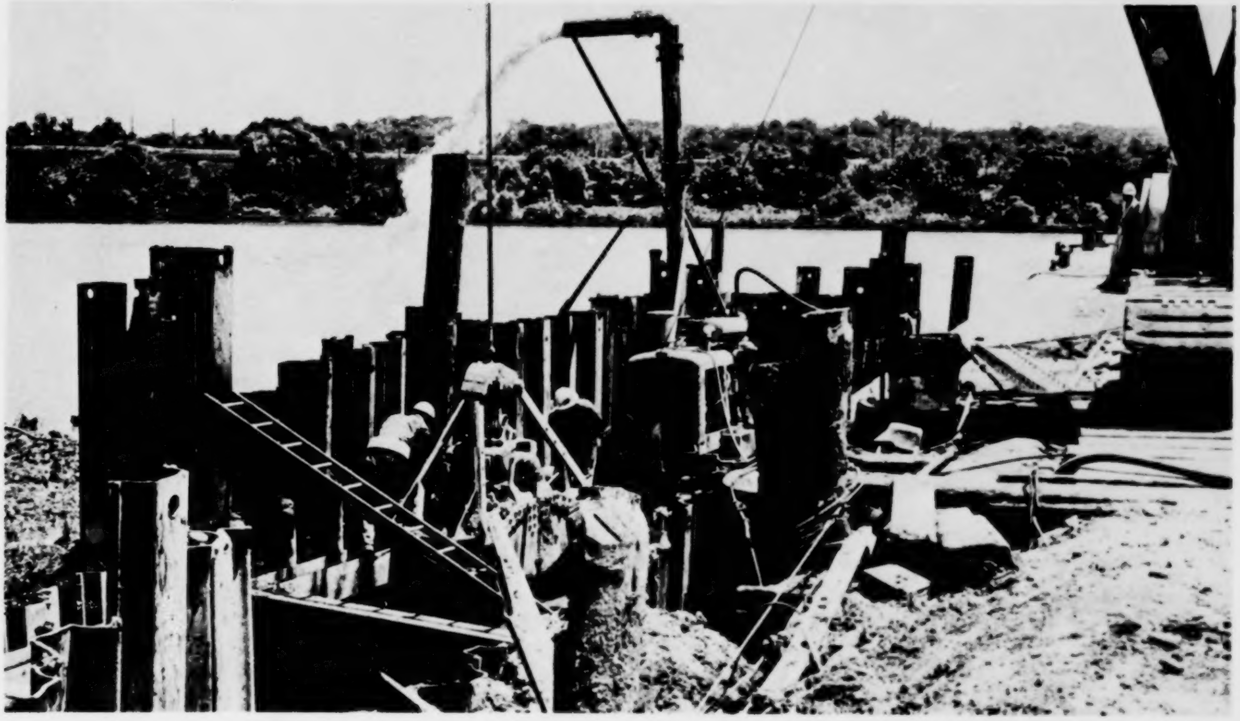
As the sewers in the older section of the city are gradually converted to separate systems under the Storm Sewer Separation Program, the two-line interceptor will have the built-in capacity to move the full flow of sanitary sewage to the treatment plant. Eventually, the system will thus be doing the same work that the rejected Project A would have done at much greater cost.

PROTECTING THE ANACOSTIA RIVER

On the Anacostia River, Project C begins with a new sanitary sewage pumping station in the extreme southern end of the D.C. Stadium parking lot connected to a 4-foot diameter line designed to carry sanitary flows from a separate system area to treatment without mixing with combined sewage and to relieve the flow in the existing East Side Interceptor Sewer downstream from the Northeast Boundary Sewer. From that station, the sewage is pumped under the river to the new Anacostia River Force Main and Gravity Sewer built by the District of Columbia and the Washington Suburban Sanitary Commission. From there it flows to the existing outfall sewers.

Northward and across the Anacostia from the Poplar Point Station, the new O Street Pumping Station adjoining the old Main Sewerage Pumping Station was designed to handle separately a part of the flow from the B Street-New Jersey Avenue Trunk Sewer and sanitary flows from the redeveloped Southwest and pump it across the river to the outfall sewer and to Blue Plains.

The treatment provided at Blue Plains involves grit removal, prechlorination, sedimentation, aeration of the settled sewage and final sedimentation, accompanied by digestion, elutriation, and dewatering of sludge removed in the process. The effluent from the final sedimentation step is chlorinated and discharged to the Potomac.



The treated sludge may be used as a fertilizer base, soil builder or top dressing, or incinerated, with the residue disposed to a land fill.

The plant is capable of fully treating all sanitary sewage originating in separated areas and all dilutions of up to 2-to-1 of storm and sanitary sewage from combined areas. The difference between this capacity and the 5-to-1 dilution delivered to the plant by Project C sewers is given partial treatment, consisting of preliminary sedimentation and chlorination, and then discharged to the river.

COORDINATED WITH OTHER PROJECTS

Several unavoidable delays were encountered before Project C could be put into full operation. Two of the most serious involved the problem of coordinating work on Project C with other construction projects.

It was not advisable to complete the Upper Potomac Interceptor Relief until a decision had been reached on the exact location of the proposed bridge in the vicinity of the Three Sisters Islands because the sewer would obviously have to be built in such a way as not to interfere with construction of the bridge and its approaches.

The same problems arose downstream from the Potomac Pumping Station where construction was delayed on the Force Main until a decision had been made on the location of a highway and tunnel in the vicinity of the Lincoln Memorial. Another delay was experienced while decisions were awaited on future uses of the Bolling Field area.

While decisions on these projects were awaited, the Department of Sanitary Engineering was forced to rely entirely on an old and badly overloaded interceptor through the city, roughly paralleling the new interceptor.

Project C was designed to handle the amount of sewage expected to be produced in this area in the year 2000—and there is every reason to hope that it will be adequate somewhat after that date. Eventually, it is assumed, the system will have to be expanded and improved even further.

But, even though they may eventually become part of an expanded system, the conduits of Project C are designed to last . . . and last . . . and last. The concrete pipe used in its construction, for example, is built with an extra inch of "sacrificial concrete" which can be worn away in time without affecting the strength of the pipe.

The engineers who designed and built the system are confident that the lines of Project C will still be doing their share of protecting the Potomac, the Anacostia and Rock Creek well into the next century—or longer.

A pump sucks water from the excavation as workmen carry the East Side Relief Sewer under the Anacostia River

Preserving the Environment

The sole purpose of Project C is to make the District of Columbia a safer and more pleasant place to live. Special care was therefore taken in the design and construction of the system to avoid anything that would detract from the quality of life in the District. For example:

- In cooperation with the Commission of Fine Arts and the Department of Highways and Traffic, the Potomac River Pumping Station was hidden under the approach to the new Theodore Roosevelt Bridge so that it is virtually invisible to the passerby.
- The East Side Interceptor Pumping Station was built underground in a remote corner of the D.C. Stadium parking lot. It, too, is virtually hidden from view.
- The West Side Rock Creek Diversion Sewer was separated vertically to allow half of the structure to be used for the flow from the Rock Creek Main Interceptor Relief, thus protecting the creek from contamination.
- To avoid defacing the parklands along the historic C & O Canal, a major portion of the Upper Potomac Interceptor was laid underneath the canal bed. When water was restored to the canal, no sign remained of the major construction project and the canal and towpath were in better condition than when they were new.
- At Fletcher's Boathouse, on the canal, the sewer line was designed so as not to destroy a picturesque service roadway passing under the canal nor the ancient stone wall supporting Canal Road.
- Along Kenilworth Avenue, air vents essential for proper operation of the sewer system were installed in tall, slender columns almost identical to the graceful lighting fixtures along the freeway.

686

APPENDIX

BASIC DESIGN DATA

The basic data given herein for the design of separate sewers and interceptors, and for the design of combined sewers and storm drains, are those selected by the Board of Engineers for its study of the existing sewers and for the design of new ones.

SEPARATE SEWERS AND INTERCEPTORS

A "separate" or so-called "sanitary" sewer is a sewer which carries sewage and groundwater infiltration, but comparatively little storm and surface water. It carries also some other wastes, such as those from garages, laundries, milk depots, and the like.

An interceptor is a sewer which receives the dry-weather sewage flow from a number of transverse sewers or outlets, and frequently predetermines quantities of stormwater (if from a combined system) and conducts such waters to a point for treatment or disposal.

In both the District and the area in Maryland serviced by the Washington Suburban Sanitary Commission it is permissible to drain to separate sewers a limited amount of areaway, and in the District some depressed driveway. Therefore, in the design of separate sewers and interceptors, it is necessary to allow for some stormwater.

While separate sewers are designed and so built as to prevent the infiltration of large amounts of groundwater, there usually is some infiltration, particularly from the older sewers, manholes, and house connections. Allowance has been made in the computations for some groundwater infiltration.

Certain basic design data are shown in Table 1.

Hourly peak rates of dry-weather flow were computed by the use of factors applied to the yearly average total dry-weather flow, ranging from a factor of 2.0 for average flows exceeding 60 mgd. to 6.0 for the lowest flows, as shown on Fig. 1.

Hourly peak stormwater allowances were made, ranging from 15,400 gad. for a 10-acre area having a density of 40 persons per acre, to 1,480 gad. for a 10,000-acre area having a density of 10 persons per acre. Details are shown in Fig. 2.

In the design of interceptors, it was necessary to provide for intercepting additional amounts of stormwater from each tributary combined sewer to protect the waterway from the heavier concentrations of pollution. The amount of stormwater to be intercepted may be expressed as the yearly average dry-weather sewage flow multiplied by a number, herein referred to as the dilution factor.

Table 1

Description	Estimated Yearly Average Sewage Flows for the Year 2000
Domestic sewage, gallons per capita per day (gcd.)	65
Commercial and industrial wastes from neighborhood areas (gcd.)	15
Sewage from other commercial and industrial areas, and from governmental and municipal sources	Special consideration for each case
Yearly average flow, groundwater infiltration, gallons per acre per day (gad.)	700

A minimum design peak rate of 300 gcd. has been adopted for separate sewers and interceptors.

COMBINED SEWERS AND STORM DRAINS

The rate of runoff of stormwater in this report has been computed by the so-called rational method.

The fundamental basis of this method of computation is the intensity and duration of rates of rainfall. The intensities selected for the basis of design in this report are those which may be expected to be equaled or exceeded once in 15 years on the average.

The determination of the so-called 15-year rainfall-frequency curve, which is summarized in Table 2 and shown on Fig. 3, was the result of a comprehensive study of the records of the U. S. Weather Bureau of intense rates of precipitation at the "City Office" of the Bureau in the District for the 60-year period from 1894 to 1954.

Table 2. Rate of Rainfall Adopted as Basis of Design of Combined Sewers and Storm Drains in District of Columbia

Duration, min.	Rate, in. per hr.	Duration, min.	Rate, in. per hr.
5	7.56	60	2.66
10	6.30	80	2.22
15	5.44	100	1.92
20	4.81	120	1.70
30	3.95	150	1.46
45	3.16	180	1.29

Storms of high intensity occur at comparatively infrequent intervals. To provide for the most intense precipitation which may be expected would require sewers so large as to be prohibitively expensive. It is considered to be adequate to provide sewers having a capacity sufficient for the runoff from rains of moderate frequency, which may be built at reasonable cost and which will not be surcharged too often to cause damage from flooding.

In making the computations, provision has been made for conditions of development estimated as of the year 2000.

The assumed proportion of impervious surface has varied from 5 or 10 percent in parks, cemeteries, and the like, to 100 percent in the downtown sewer districts which are completely developed.

The ratios of the amounts of stormwater runoff to the amounts of rainfall used in the design, that is, the coefficients of runoff, are as follows:

$C = 0.30$ for pervious surfaces
$C = 0.90$ for impervious surfaces

The inlet time has been taken, generally, as 10 min. The time of flow through the existing sewers and the corresponding sewer capacity have been computed from velocities determined by using a value of 0.015 for the coefficient of friction, *n*, in the Manning formula, in most cases. For areas of 500 acres and larger, the stormwater runoff has been reduced by a rainfall "distribution coefficient," as shown on Fig. 4.

COMPUTATIONS FOR PROPOSED SEWERS

The value of the coefficient of friction, *n*, has been assumed to be 0.015 for sewers 24 in. and less in diameter and 0.013 for sewers 27 in. and larger. These values of *n* have been used for the sewers, but the necessary head losses in the case of curves, junction chambers, transitions, and the like, as well as for all increases in velocity, have been included.

A minimum velocity of 2.0 fps. (feet per second) has been used for separate sewers and interceptors when the sewer is filled or half filled, based on the value of *n* being 0.013. This applies also to the smaller sewers, where the computed capacity has been based on a value of 0.015 for *n*. Higher velocities have been used when practicable; also where practicable, a minimum slope of 0.0005 has been used for these sewers.

Similarly, a minimum velocity of 3.0 fps. has been used, in general, for combined sewers and stormwater sewers, when filled or half filled. Where practicable, velocities greater than 3.0 fps. have been used, particularly for sewers 42 in. and larger in diameter.

In most cases, the proposed sewers have been assumed to flow just filled; that is, with the hydraulic grade line at the sewer crown. However, in some cases a hydraulic grade line above or below the crown has been used, in which case the sewer capacity has been based on the hydraulic grade line.

Velocity-head losses have been compensated for in computing the hydraulic grade line where the velocity increases in progressing downstream, but recovery of velocity head where the velocity decreases has, in general, been neglected. Allowance has been made for additional head losses in the case of curves, junction chambers, transitions, and the like.

FIGURE I

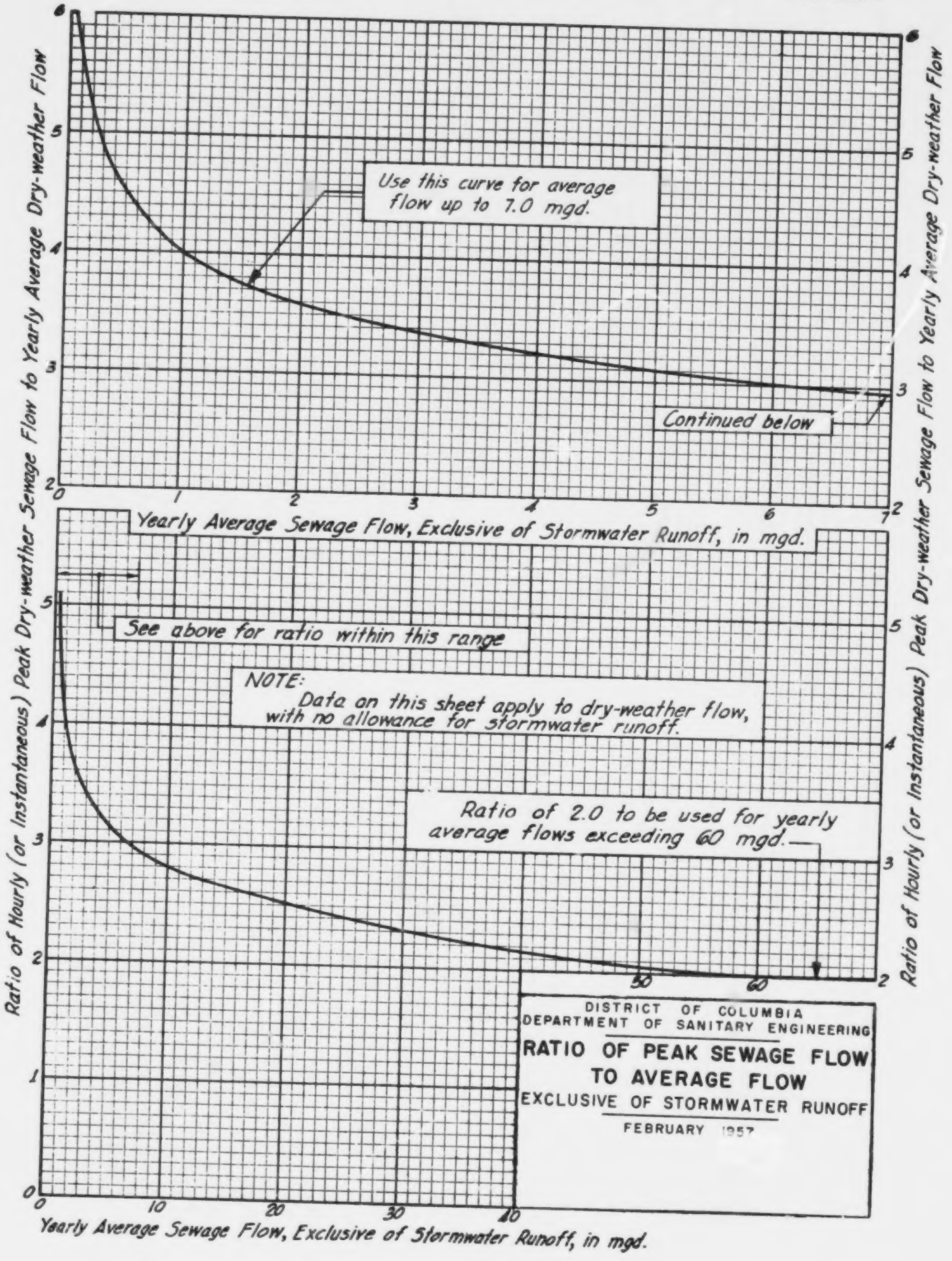
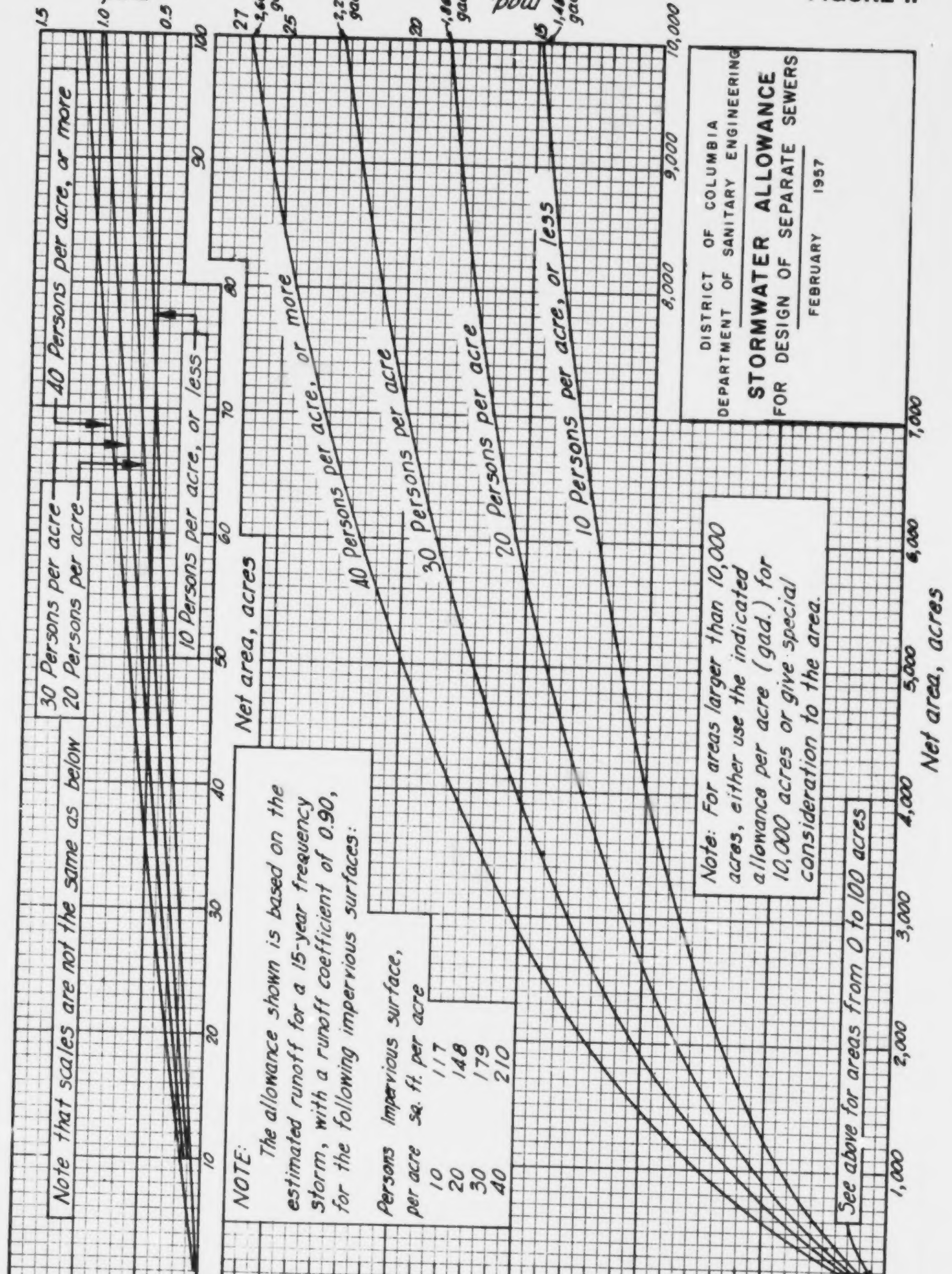

Ratio of Hourly (or Instantaneous) Peak Dry-weather Sewage Flow to Yearly Average Dry-weather Flow
Use this curve for average flow up to 7.0 mgd.
Continued below
Yearly Average Sewage Flow, Exclusive of Stormwater Runoff, in mgd.
See above for ratio within this range
NOTE: Data on this sheet apply to dry-weather flow, with no allowance for stormwater runoff.
Ratio of 2.0 to be used for yearly average flows exceeding 60 mgd.
0
1
2
3
4
5
6
7
10
20
30
40
50
60
DISTRICT OF COLUMBIA
DEPARTMENT OF SANITARY ENGINEERING
RATIO OF PEAK SEWAGE FLOW TO AVERAGE FLOW
EXCLUSIVE OF STORMWATER RUNOFF
FEBRUARY 1957

FIGURE II



DISTRICT OF COLUMBIA
DEPARTMENT OF SANITARY ENGINEERING

STORMWATER ALLOWANCE
FOR DESIGN OF SEPARATE SEWERS

FEBRUARY 1957

NOTE:
The allowance shown is based on the estimated runoff for a 15-year frequency storm, with a runoff coefficient of 0.90, for the following impervious surfaces:

Persons per acre	Impervious surface, sq. ft. per acre
10	117
20	148
30	179
40	210

Note: For areas larger than 10,000 acres, either use the indicated allowance per acre (gad.) for 10,000 acres or give special consideration to the area.

Note that scales are not the same as below

See above for areas from 0 to 100 acres

FIGURE III

INTENSITY - DURATION - FREQUENCY RAINFALL CURVES

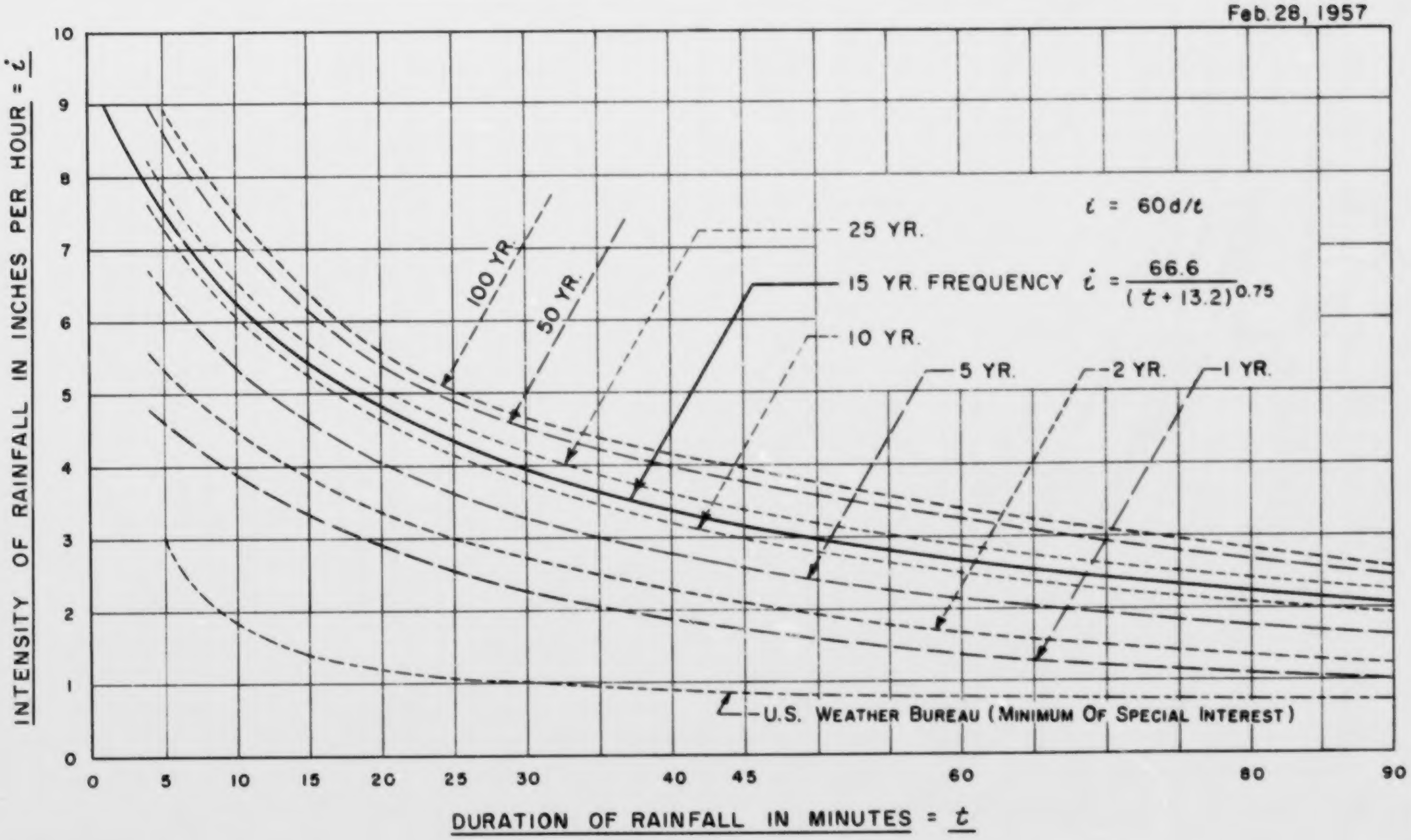
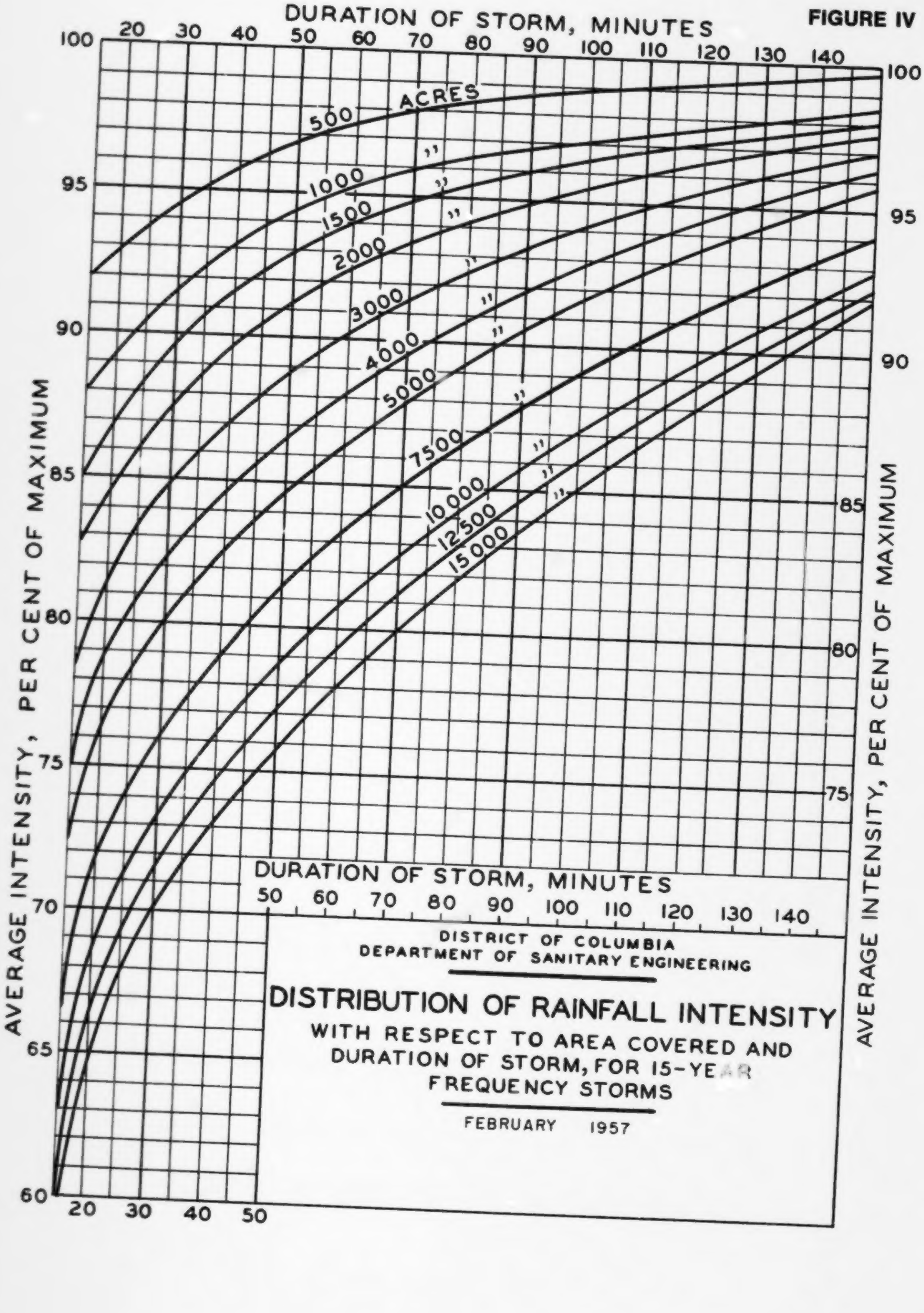


FIGURE IV



DISTRICT OF COLUMBIA
DEPARTMENT OF SANITARY ENGINEERING

DISTRIBUTION OF RAINFALL INTENSITY
WITH RESPECT TO AREA COVERED AND
DURATION OF STORM, FOR 15-YEAR
FREQUENCY STORMS

FEBRUARY 1957

692
THIS SEWER CONSTRUCTION
IS ANOTHER STEP TOWARD
REDUCING POLLUTION IN
THE POTOMAC RIVER

GOVERNMENT OF THE DISTRICT OF COLUMBIA
DEPARTMENT OF SANITARY ENGINEERING
DISTRICT BUILDING
WASHINGTON, D.C. 20004

THE SEWERAGE SYSTEM
OF THE
DISTRICT OF COLUMBIA

DEPARTMENT OF SANITARY ENGINEERING
DISTRICT OF COLUMBIA GOVERNMENT

JANUARY 1965

THE SEWERAGE SYSTEM
OF THE DISTRICT OF COLUMBIA

TABLE OF CONTENTS

PART I -- GENERAL Page

History 1
Current Construction Program 3

PART II -- COLLECTION SYSTEM

Major Trunk and Interceptor Sewers 4
Sewer Separation Program 4

PART III -- SEWAGE PUMPING STATIONS

Rock Creek Sewage Pumping Station 6
Main Sewerage Pumping Station 6
Potomac Sewage Pumping Station 6
"O" Street Sewage Pumping Station 7
Upper Anacostia Sewage Pumping Station 7
Poplar Point Sewage Pumping Station 7
Earle Place Sewage Pumping Station 7

PART IV -- WATER POLLUTION CONTROL PLANT 8

PART V -- ADMINISTRATION AND FINANCING 9

ILLUSTRATIONS

PLATE I -- Principal Combined and Separate Sanitary Sewers

PLATE II -- Area Served By Combined and Separate System Sewers In The District Of Columbia

PLATE III -- District and Suburban Areas Tributary To D. C. Sewer System

PLATE IV -- Water Pollution Control Plant, Flow Diagram

GENERAL

The sewerage system of the District of Columbia is a combination of random growth and planned development. The year 1891 roughly divides the two stages. About 1810 sewers and culverts were built to drain streets. These scattered sewers gradually became linked together to form a system which was intended to carry only storm or ground water.

There is no definite record of the date on which waterborne sanitary wastes first entered this system. It probably was sometime after 1840 when the first interior piping of water in houses occurred. The water supply for the city at that time depended on wells, cisterns and springs. Beginning in 1808 water from these sources had been piped through some of the streets and made available to the public through hydrants.

There appears to have been some use of water-flushed plumbing in the 1840's and 1850's, however the installations were made at such a slow rate that sanitary sewage did not immediately become a problem. In 1858 the Corporation permitted connections to the sewers but required strainers to prevent any filth in a solid state from passing into the sewers. By 1859 a new source of water supply, the Washington Aqueduct, temporarily receiving water from Little Fall Branch in Maryland, had become available and in 1863 water from the Potomac River was introduced. Between these two dates, the population increased abruptly due to the start of the Civil War. The increase in population from 1860 to 1870 was 79% in the City of Washington and 76% in the entire District.

Since the original culverts and sewers generally discharged into the nearest accessible waterway, the increase in sanitary sewage discharge resulting from the increased population and additional water supply quickly created very offensive conditions in open streams and canals traversing the heart of the city. By modern standards the best informed men of the mid-nineteenth century were woefully unaware of the relationship between the lack of sanitation and disease, however, there was a suspicion that the two were in some way related. With the coming of the Civil War, scarlet fever and cholera broke out in various parts of the country and there was much concern about the overcrowded conditions of the Capital. Before the end of the war there were in fact epidemics of smallpox and malaria which took the lives of thousands of persons.

The governing body of the Corporation of Washington discussed the problem of sanitary sewage, however, little was done about it. It was not until 1871-1874, during the tenure of the Territorial form of government, that a general construction program was undertaken. In that period, under the Board of Public Works, approximately 80 miles of sewers were built. Although the amount of construction was impressive, much of the work was poorly, if at all planned, structurally unsound and hydraulically inadequate. Coincidental with this program, and extending to 1880, the foul conditions in Washington Canal along B Street (now Constitution Avenue) were eliminated by the construction of the B Street and Tiber Creek Sewers and the filling of the canal. As a result the problem was transferred to the marshes along the Potomac and Anacostia Rivers.

Only a few major sewer extensions were constructed during the period immediately following the changeover in 1874, from the Territorial form of government to the predecessor of the present Commissioner form, as most of the available funds were needed to liquidate obligations incurred by the preceding administration and to replace faulty work.

In 1889 the District population was approaching 280,000 as compared to 75,000 thirty years earlier and the question of disposal of sanitary wastes could no longer be deferred. President Harrison, acting under the authority of Congress, assembled a Board composed of three outstanding sanitary engineers, Messrs. Rudolph Hering, Samuel M. Gray and Frederic P. Stearns. This Board was directed to study the situation and recommend steps to be taken to provide the city with an adequate sewerage system. The Board published its report in 1890, recommending a construction program predicated on a future population of 500,000 which they estimated would be reached by 1927, a remarkably accurate estimate since the 1930 population was 487,000.

The sewerage system which then served Washington City proper, that is the area bounded by the Potomac and Anacostia Rivers, Florida Avenue and Rock Creek, carried both sanitary and stormwater flows, in other words, a "Combined System", discharging into local waterways.

In the 1890's there was considerable difference of opinion among sanitary engineers as to the desirability of such a system. It was clearly apparent that insofar as the existing system was concerned the cost of converting it to a "Separate System", i.e. one having separate lines to carry sanitary and stormwater flows, would be prohibitive. The Board therefore recommended that the combined system be retained but that extensions to serve new areas be built as Separate Systems.

One objective of the Board was to determine a point of discharge into the Potomac River where there was a sufficient volume to adequately dilute the wastes and far enough downstream to prevent tidal action from returning it to the environs of the City. The discharge point selected was just upstream from the southern end of what is now known as Bolling Field.

This Board recommended the construction of a system of Interceptor Sewers to collect the dry weather sanitary flow and carry it to a main sewage pumping station to be located at the foot of New Jersey Avenue on the Anacostia River and thence through an outfall sewer to the selected point of discharge in the Potomac River. It was intended that these interceptors and trunk sewers be of sufficient size to carry all of the sanitary flow and that of light rains. Such sewers would also carry the first flush of heavy rains with the surplus stormwater overflowing into nearby waterways carrying with it greatly diluted sanitary sewage.

As a result of the Board's recommendations, the following sewers were constructed: (a) high level interceptors known as "F Street and Easby Point", "Four-and-a Half Street", and "Tiber Creek and New Jersey Avenue", and (b) the low level interceptors known as "Rock Creek and B Street", "East Side" and "Water and M Streets", (actually built as Water and L Streets), and the "B Street and New Jersey Avenue Trunk Sewer". Certain low level areas were filled in and other low areas were protected from flooding by dikes. In one important respect the recommendation of the Board was not strictly adhered to with the result that certain areas recommended to be sewered on a separate system were actually sewered on a combined system.

The Board did not project its recommendations beyond the needs of a population of 500,000 (reached in the early 1930's) nor could the Board anticipate the

1954 agreement between the Washington Suburban Sanitary Commission and the District of Columbia and the 1959 agreement between Fairfax County and the District of Columbia under which large quantities of sewage arising in those jurisdictions would be discharged into the District's sewerage system. As the 500,000 limit of population was reached in the early 1930's, the degree of pollution in the Potomac approximated that existing in 1890. In order to alleviate this condition, another Board of Engineers, composed of Messrs. Harrison P. Eddy, John H. Gregory and Samuel A. Greely, was engaged to study and report on sewage disposal for the District of Columbia. As a result of this study, construction of a plant to treat sewage was begun in 1935 and the plant was put in operation in 1938.

In 1954 the District of Columbia secured the services of the third Board of Engineers, composed of Messrs. Samuel A. Greely, Frank A. Marston and Gustav J. Requardt, all eminent consultants with many years experience in the sanitary engineering field, to study the then existing sewerage system and recommend revisions of the system in order to materially reduce the discharge of untreated sewage to the Potomac River and its tributaries. The Board of Engineers was also required to recommend a construction program to provide an adequate sewerage system to handle flows up to the year 2000. This report was completed in 1957.

As a result of their recommendation and subsequent modifications by the District the construction of major trunk sewers, pumping stations and house sewer separation projects were started in 1960. The following major construction projects have been or are scheduled to be completed by 1966:

(a) Upper Potomac Interceptor Relief Sewer from the D. C. Line to the Potomac Sewage Pumping Station at Theodore Roosevelt Bridge.

(b) Potomac River Interceptor System from 27th and K Streets, N. W., to Potomac Sewage Pumping Station.

(c) Potomac Sewage Pumping Station at Theodore Roosevelt Bridge.

(d) Potomac River Force Mains from the Potomac Sewage Pumping Station to a point opposite Hains Point at U. S. Naval Station.

(e) Outfall Relief Sewer from U. S. Naval Station to the Water Pollution Control Plant at Blue Plains.

(f) Rock Creek Main Interceptor Relief from the D. C. Line to P Street.

(g) Anacostia River Force Main and Gravity Sewer from Blaine Street, N. E., to the existing outfall sewers at Firth Sterling Avenue. The District of Columbia's portion of this sewer is between the Pennsylvania Railroad and Firth Sterling Avenue.

(h) East Side Pumping Station and Relief Sewer from the vicinity of D. C. Stadium to the Anacostia River Force Main and Gravity Sewer.

(i) Sewer Separation in the following drainage areas: Upper Luzon Valley; Good Hope Road; Klingle Valley; Foundry Branch; Normanstone Drive; Massachusetts Avenue; Cleveland Avenue; Connecticut Avenue; College Pond and Southwest.

COLLECTION SYSTEM

The Sewerage System of the District of Columbia (see Plate I) is designed primarily as a gravity flow system, however, due to topographic conditions, pumping stations have been provided at several points to lift the sewage to a sufficient level to obtain gravity flow.

In the newer sections of the city, separate lines are provided for sanitary sewage and storm water. In these areas, the sanitary sewage is collected in a system of service sewers, generally of 10" diameter and usually located parallel to the curb and two feet from the center line of the street. The normal depth of these sewers is eleven feet to provide for gravity flow from basements of adjacent buildings. These service sewers discharge into various size trunk or interceptor sewers. Storm sewers in these areas generally discharge into the nearest natural stream.

The older portions of the city are served by combined system sewers which are generally larger than the separate system sewers because they carry both storm water and sanitary sewage. Since these lines must be deep enough to receive the sanitary flow from building basements they are generally deeper than would be normally required for separate storm water sewers. Plate II shows the areas served by combined and separate system sewers.

In the combined system areas the sanitary sewage (dry weather flow) is collected in a system of trunk sewers which discharge into interceptor sewers and thence to the Water Pollution Control Plant. These trunk and interceptor sewers are designed to carry all the sanitary sewage and the first flush of storm runoff. During prolonged or heavy rains, the capacity of the trunk and interceptor sewers are exceeded and the surplus storm water, combined with some sanitary sewage is discharged directly into local streams. A sewer separation program, which is designed to provide separate storm and sanitary sewers and alleviate this condition, is now in progress. See Plate II for areas which have been separated.

The topography of the District of Columbia sewage area is such that it divides the city into five major valleys all falling toward the Southeast corner of the city. The valleys are as follows: (1) The main valley of the Potomac from the vicinity of 49th Street Northwest as far west as Dulles International Airport and as far north as Damacus, Maryland; (2) The Foundry Branch basin including Georgetown west of Wisconsin Avenue; (3) Rock Creek including Piney Branch and extending into Maryland to the vicinity of Rockville and Kensington; (4) The Anacostia River extending into Maryland to the vicinity of Olney; and (5) Oxon Run extending into Maryland to the vicinity of Oakland.

As the result of the Maryland-District of Columbia Sewage Agreement of 1924, amended in 1954, and the Virginia-District of Columbia Sewage Agreement of 1959, additional drainage areas of 436 square miles in Maryland and 228 square miles in Virginia, are now tributary to the District of Columbia's sewerage System. See Plate III.

In addition to the sewers scheduled for completion in 1966, these areas are served by the following trunk sewers and interceptors within the District of Columbia: (1) Upper Potomac Interceptor; (2) the Rock Creek Main Interceptor;

(3) the Anacostia Main Interceptor; (4) the Outfall Sewer; (5) the Oxon Run Interceptor; and (6) the Lower Oxon Run Trunk Sewer. Certain areas in Maryland and Virginia will utilize the Potomac Interceptor extending from the District Line to Dulles International Airport. This interceptor sewer including branch lines will be 42.8 miles long and have an outlet capacity of 150 million gallons per day. See Plate III for the area tributary to the Potomac Interceptor.

SEWAGE PUMPING STATIONS

Portions of the city are at elevations so low that sewers in these areas are necessarily below sea level. Since gravity flow cannot be maintained throughout the system pumping stations are required to lift the sewage to higher elevations. The seven Sewage Pumping Stations in the District of Columbia's sanitary and combined sewerage systems are as follows:

(1) Rock Creek Sewage Pumping Station

This station is located at 27th and K Streets, N.W. Combined sewage from the Upper Potomac Interceptor is pumped to the Potomac River Interceptor System. This pumping station has three electrically driven pumps, each with a rated capacity of 10.4 million gallons per day at a maximum head of 24 feet.

(2) Main Sewerage Pumping Station

This station is located on the west bank of the Anacostia River at the foot of New Jersey Avenue, S. E. Practically all the sewage in the District of Columbia west of Anacostia River and all of the sewage from Upper Potomac Interceptor and Rock Creek Main Interceptor drainage areas is presently conveyed to this station. At present sewage enters this station from the following sewers: (a) B Street-New Jersey Avenue Trunk Sewer; (b) Tiber Creek Trunk Sewer; (c) East Side Interceptor Sewer; and (d) Pennsylvania Avenue Low-Level Sewer.

The storm flow from these sewers is discharged to the Anacostia River. Sanitary sewage is pumped to the Outfall Sewer through triple 60" diameter siphons crossing under the Anacostia River.

This station has four sanitary sewage pumps and six combined sewage pumps. The four sanitary pumps are rated as follows: One-100 million gallons per day; one-80 million gallons per day; and two-60 million gallons per day. Each of the six combined sewage pumps is rated at 80 million gallons per day.

When the sewers scheduled for completion in 1966 are placed in service, flows from the Upper Potomac Interceptor and Rock Creek drainage areas will be diverted to the Potomac Sewage Pumping Station.

(3) Potomac Sewage Pumping Station

This station is located at the east end of the Theodore Roosevelt Bridge. Construction of sanitary portion of this station was completed in 1963 and the sanitary sewage is presently being discharged to the B Street-New Jersey Avenue Trunk Sewer. Upon completion of the Potomac River Force Mains and Outfall Relief Sewer, both sanitary and combined sewage from this station will be conveyed directly to the Water Pollution Control Plant.

The station will pump sanitary sewage from the Upper Potomac Interceptor Relief Sewer and Rock Creek Main Interceptor Sewer. Combined sewage will be pumped from the East Rock Creek Diversion Sewer and the Upper Potomac Interceptor Sewer.

The station presently has two electrically driven variable speed pumps rated at 30 to 88 million gallons per day with 500 h.p. motors. These pumps will discharge 120 million gallons per day each when equipped with 1250 h.p. motors. The present total capacity of the station is 176 million gallons per day. The future capacity of the station when all pumps have been installed will be 318.1 million gallons per day.

(4) "O" Street Sewage Pumping Station:

This station is located on the west bank of the Anacostia River at the foot of "O" Street and adjacent to the Main Sewerage Pumping Station. The sanitary sewage is pumped from the "O" Street Interceptor to the Outfall Sewer through one of the triple 60" diameter siphons under the Anacostia River. Storm water will enter the station from the B Street-New Jersey Avenue Trunk Relief Sewer now partially completed and will be pumped to the Anacostia River.

Four sanitary pumps are presently installed with a rated capacity of 15 million gallons per day each. Six storm water pumps will be installed in the future, each with a rated capacity of 100 million gallons per day.

(5) Upper Anacostia Sewage Pumping Station

This small underground station is located at Anacostia Avenue and Grant Street, N. E. Sanitary sewage is pumped from the Upper Anacostia Main Interceptor Sewer to the Anacostia Main Interceptor. This station has two electrically driven and one gasoline engine driven pumps, with a combined rated capacity of 7.1 million gallons per day.

(6) Poplar Point Sewage Pumping Station

This station is located at South Capitol Street just east of the Anacostia River. Sanitary sewage is pumped from the Anacostia Main Interceptor to the Twin Outfall Sewers. This station has three electrically driven pumps each with a rated capacity of 20 million gallons per day.

(7) Earle Place Sewage Pumping Station

This station is located at Earle Place, N. E., adjacent to Baltimore and Ohio Railroad. The sanitary sewage from a small residential area is pumped to the Bladensburg Road Trunk which discharges to the East Side Interceptor Sewer. This station has two automatically controlled electrically driven pumps with a combined rated capacity of 400 gallons per minute.

WATER POLLUTION CONTROL PLANT

Sewage treatment is provided at this plant which is located at the extreme southern tip of the District on land acquired for this purpose in 1919.

Initial construction of primary treatment facilities was begun in 1935 and the plant was placed in operation in 1938. At that time the primary plant was thought to be adequate for approximately 15 to 20 years. However, the abnormal increase in population during World War II necessitated the construction of additional primary facilities in 1949.

These primary facilities together with additions to the present time provide grit separation, primary sedimentation, aeration, secondary sedimentation, digestion, elutriation (washing), dewatering, pre- and post-chlorination, drying and incineration of sludge. Plant expansions have been based on the Board of Engineer's report of 1956. Planning for future expansion is based on the Board of Engineer's study of 1964 which anticipates sewage treatment requirements to the year 2000.

Actually the Water Pollution Control Plant is a metropolitan facility serving extensive areas in Maryland and Virginia. Each jurisdiction pays its proportionate share of capital and operating costs in accordance with agreements made with the Washington Suburban Sanitary Commission in 1954 and Fairfax County in 1959. As a result of the recent completion of the Potomac Interceptor, serving Dulles International Airport, it is anticipated that Maryland and Virginia areas contributing flows to the plant will embrace approximately 664 square miles.

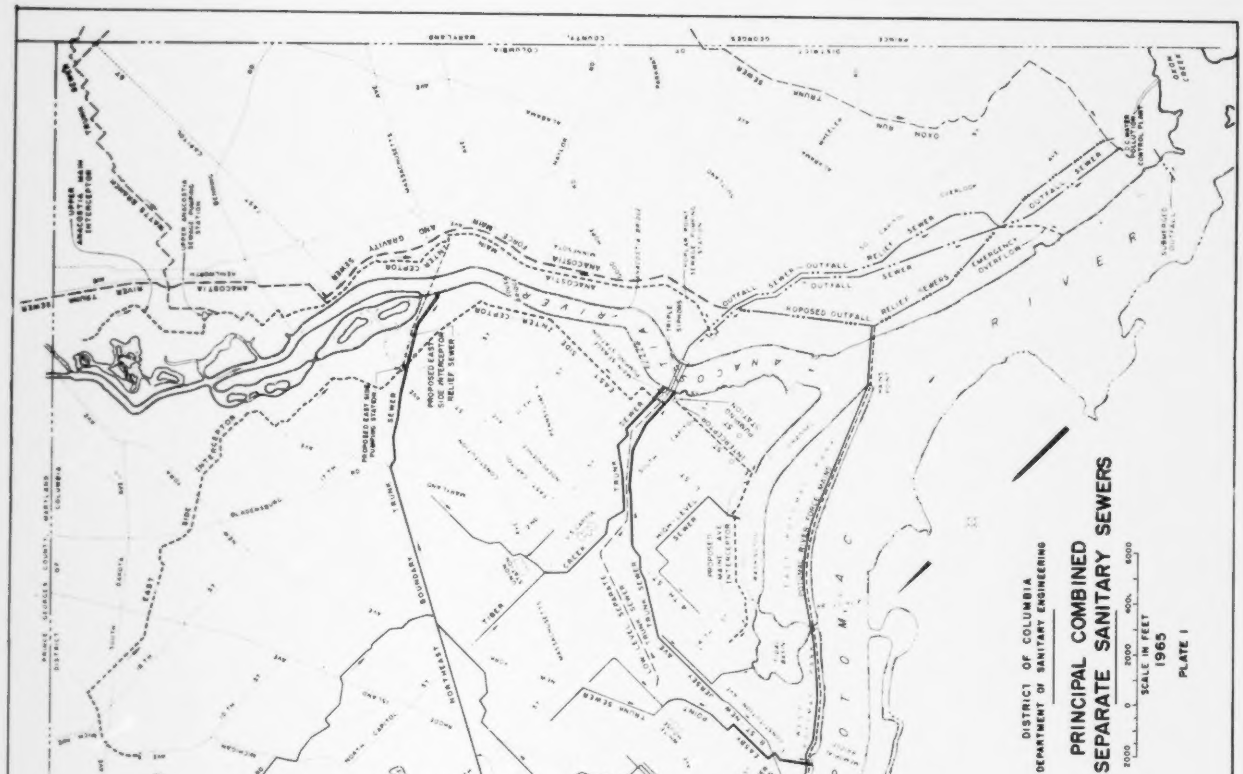
A flow diagram of existing facilities has been included in this pamphlet. See Plate IV.

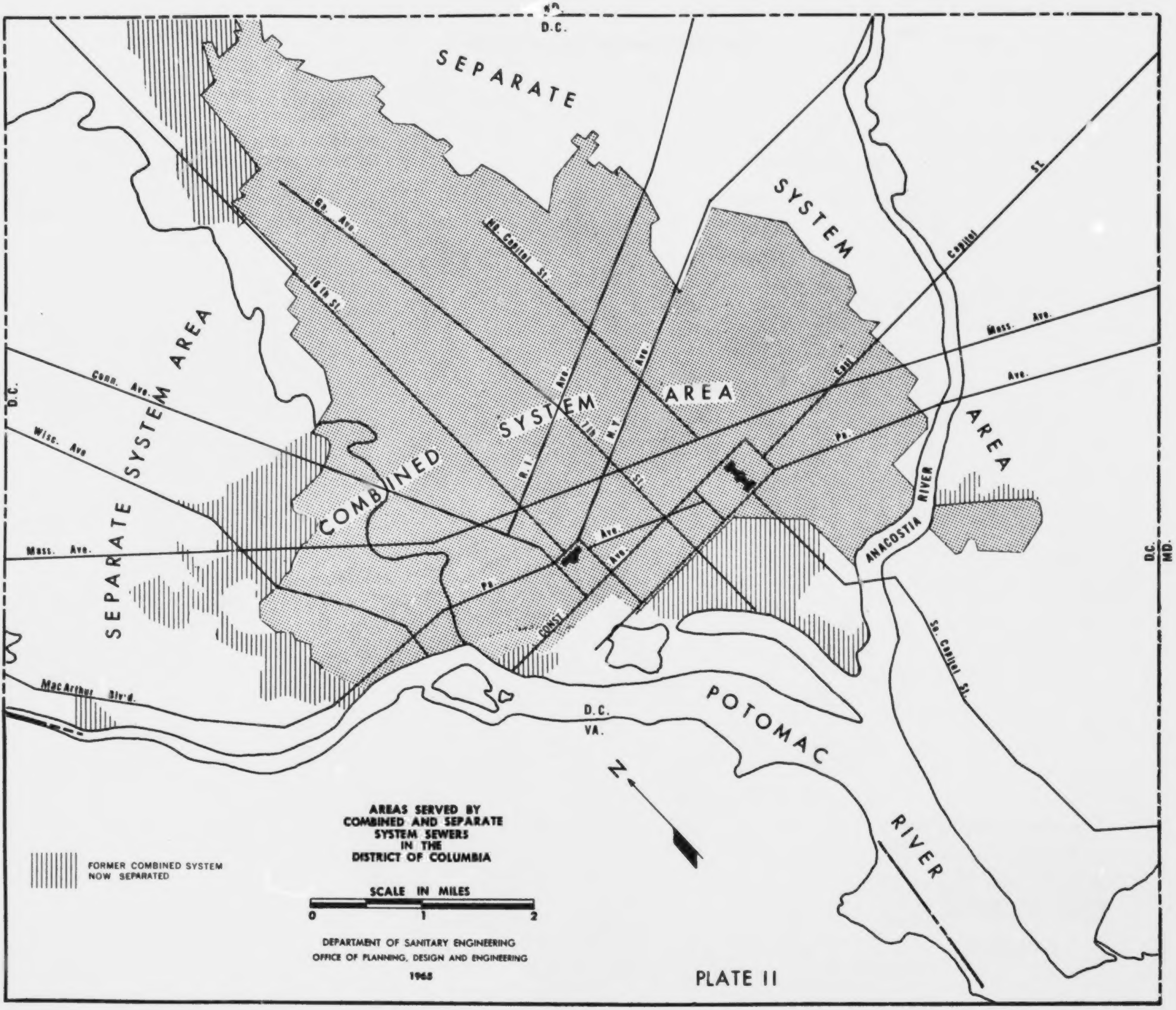
ADMINISTRATION AND FINANCING

The sewerage system of the District of Columbia is administered by the Director of Sanitary Engineering who also directs the Water Distribution System and the Sanitation Division. Fiscal and personnel matters relating to the system are handled through the Department's Office of Business Administration. Planning and engineering aspects of the system come under the Office of Planning, Design and Engineering which also performs a similar function in relation to the water distribution system. Construction of all departmental work is handled by the Construction and Repair Division. Operation of the sewer system including the Water Pollution Control Plant is covered by the Sewer Operations Division.

Funds for sanitary sewers and the Water Pollution Control Plant are derived primarily from an annual sewer service charge amounting to 70% of the bill for water rent. The bill for water rent includes the sewer service charge. In addition, some funds are secured by levying a front foot assessment of $4.00 against all property provided with sanitary sewer service. This is a one-time charge levied upon completion of the sewer. Storm water sewers are, in the main, constructed and maintained out of general funds of the District appropriated annually by Congress on the basis of a budget submitted by the Board of Commissioners of the District. In some instances storm water sewers are financed out of other funds derived from the Highway Department or private individuals when sewers are installed for special, non-public purposes.

As of the end of fiscal year 1964 there were 1697 miles of sewer, of all types, in service within the District.

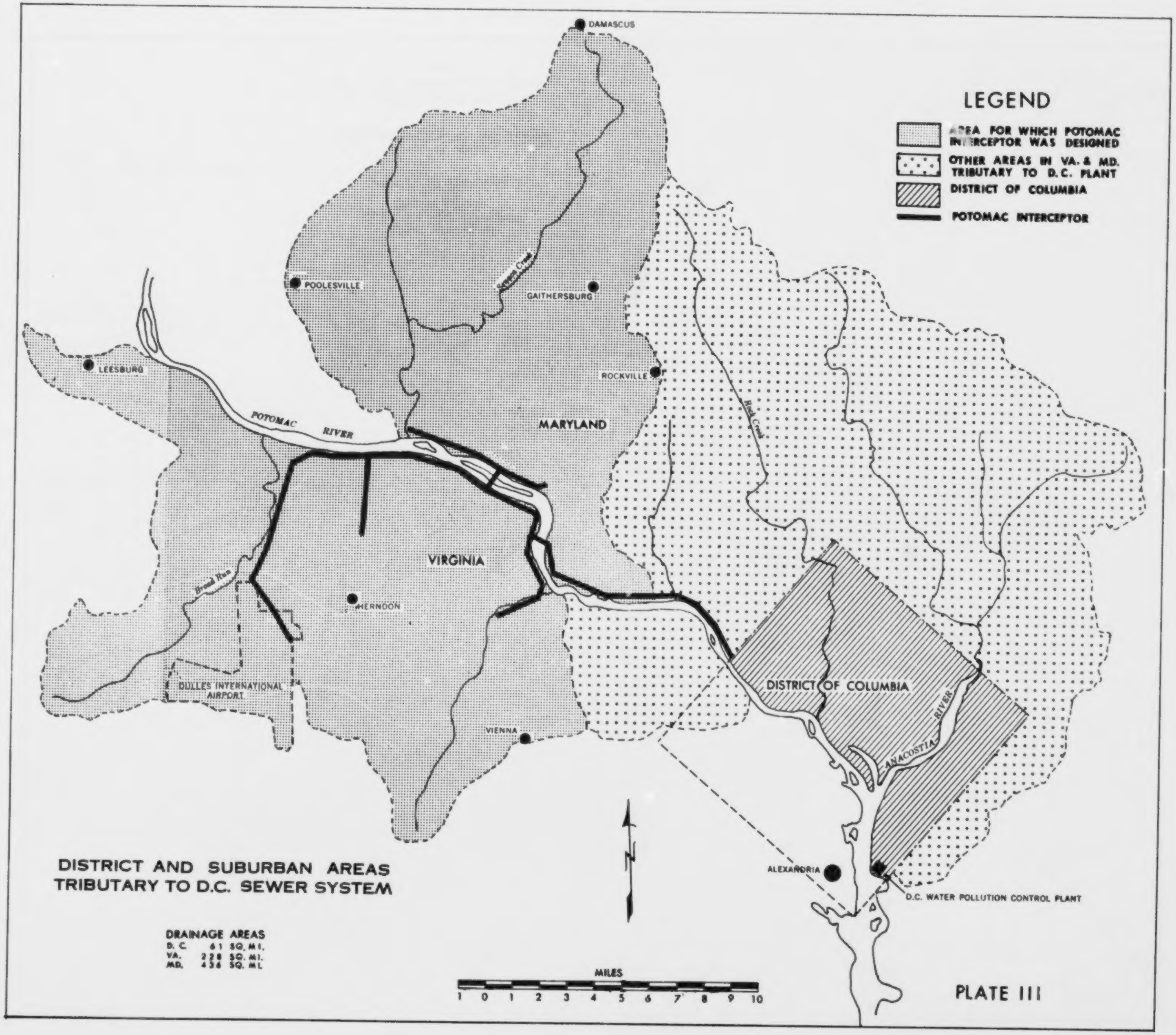

DISTRICT OF COLUMBIA
DEPARTMENT OF SANITARY ENGINEERING
PRINCIPAL COMBINED AND SEPARATE SANITARY SEWERS
2000 0 2000 4000 6000
SCALE IN FEET
1965
PLATE I
LEGEND
COMBINED SEWERS 27" AND LARGER
SEPARATE SANITARY SEWERS 12" AND LARGER
DIVERSION SEWERS
INTERCEPTING SANITARY SEWERS
OUTFALL SEWERS TO (AND FROM) SEWAGE TREATMENT PLANT
DISTRICT OF COLUMBIA BOUNDARY LINE
STREET LINES
OUTFALL RELIEF SEWERS
POTOMAC
RIVER
ANACOSTIA
PINEY BRANCH TRUNK SEWER
PINEY BRANCH RELIEF SEWER
ROCK CREEK MAIN INTERCEPTOR
ROCK CREEK DIVERSION SEWER
WEST ROCK CREEK DIVERSION SEWER
FOUNDRY BRANCH TRUNK SEWER
BROAD BRANCH TRUNK SEWER
FALLS BRANCH TRUNK SEWER
LUZON VALLEY TRUNK SEWER
SPRING ROAD TRUNK SEWER
NORTHEAST BOUNDARY TRUNK SEWER
TIBER CREEK TRUNK SEWER
LOW LEVEL SEPARATE TRUNK SEWER
EAST SIDE INTERCEPTOR
PROPOSED EAST SIDE INTERCEPTOR RELIEF SEWER
PROPOSED EAST SIDE PUMPING STATION
UPPER ANACOSTIA MAIN INTERCEPTOR
UPPER ANACOSTIA SEWAGE PUMPING STATION
ANACOSTIA MAIN FORCE MAIN AND GRAVITY SEWER
OUTFALL SEWER
OUTFALL RELIEF SEWER
PROPOSED OUTFALL RELIEF SEWERS
EMERGENCY OVERFLOW
OXON RUN TRUNK SEWER
D.C. WATER POLLUTION CONTROL PLANT
OXON CREEK
PROPOSED UPPER POTOMAC INTERCEPTOR RELIEF
POTOMAC RIVER SEWERAGE SYSTEM UPPER POTOMAC INTERCEPTOR RELIEF SEWER
UPPER POTOMAC INTERCEPTOR
POTOMAC PUMPING STATION
DALECARLIA RESERVOIR
MONTGOMERY COUNTY, MARYLAND
PRINCE GEORGES COUNTY, MARYLAND
DISTRICT OF COLUMBIA
COUNTY LINE
COLORADO AVE
NEW HAMPSHIRE
GEORGIA AVE
CONNECTICUT
MASSACHUSETTS
NEBRASKA
WISCONSIN
NEW MEXICO AVE
CANAL RD
MAC ARTHUR
CHURCH RD
ROCK CREEK
EAST BRANCH



AREAS SERVED BY
COMBINED AND SEPARATE
SYSTEM SEWERS
IN THE
DISTRICT OF COLUMBIA

DEPARTMENT OF SANITARY ENGINEERING
OFFICE OF PLANNING, DESIGN AND ENGINEERING
1968

PLATE II



DISTRICT AND SUBURBAN AREAS
TRIBUTARY TO D.C. SEWER SYSTEM

DRAINAGE AREAS
D. C. 61 SQ. MI.
VA. 228 SQ. MI.
MD. 436 SQ. MI.

PLATE III

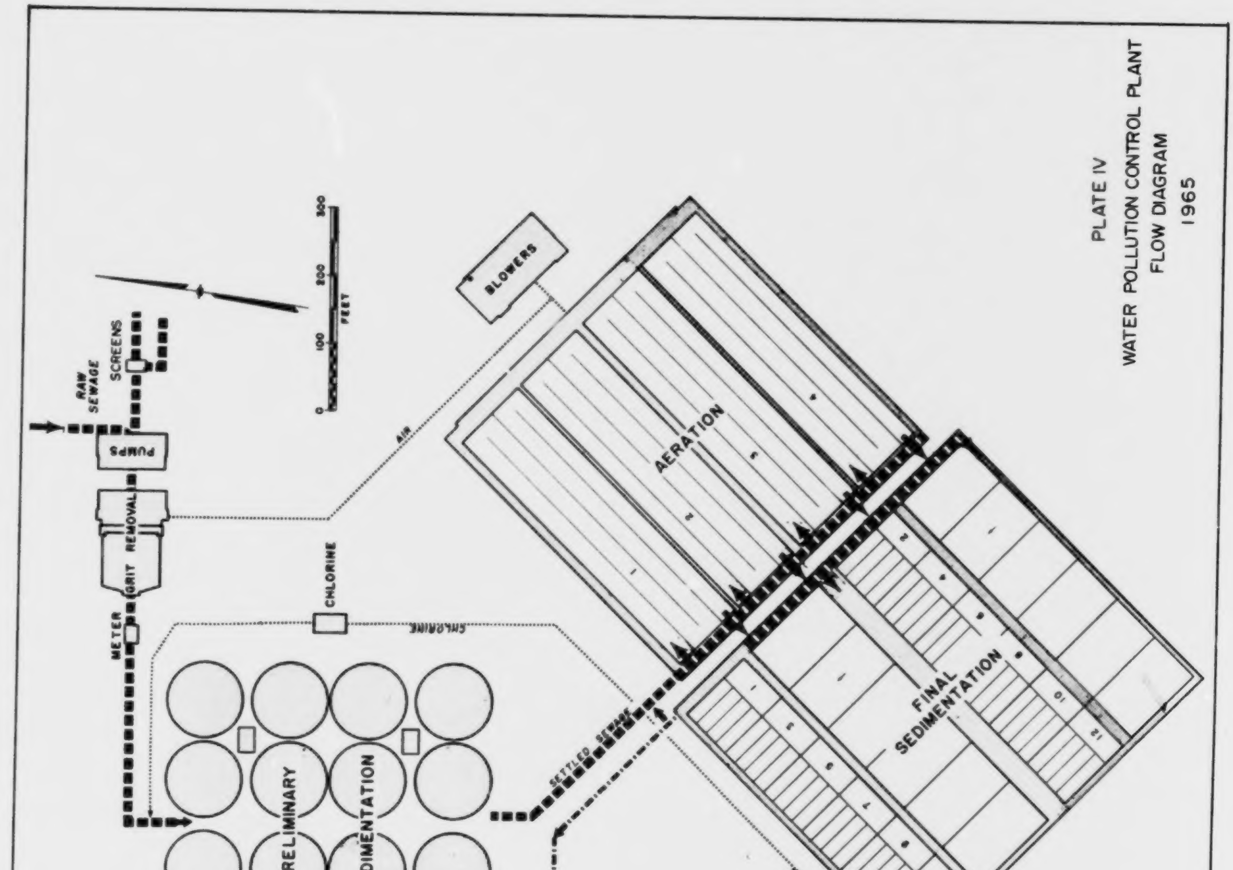


PLATE IV
WATER POLLUTION CONTROL PLANT
FLOW DIAGRAM
1965

DESIGN DATA
1,791,000 POPULATION
290 M.G.D. MAXIMUM SUMMER MONTH

709

SEWER SEPARATION PROGRAM

FOR WASHINGTON D. C.

DEPARTMENT OF SANITARY ENGINEERING

1966

DISTRICT OF COLUMBIA GOVERNMENT

The continuing interest of the Citizens Council For A Clean Potomac in the sewer separation problem and its cooperation in the organization of this booklet is acknowledged.

SEWER SEPARATION PROGRAM

A program to eliminate discharges of untreated sewage to the Potomac River at Washington, D. C., by conversion of all combined system sewers to separate systems.

DEPARTMENT OF SANITARY ENGINEERING

SEWER SEPARATION PROGRAM

TABLE OF CONTENTS

Introduction 1

Combined and Separate Sewer Systems 2

Report of Board of Engineers 4

Our Program 4
  First Steps
  Early Benefits
  New Plumbing Code
  Coordination with Other City Plans

Separation Work Completed Prior to 1966 9

Timetable for System Separation 10
  Stage I through V

Footnote to 1966 Edition

TABLE OF ILLUSTRATIONS

FIGURE I. Comparison of Sewage Collecting Systems 3

FIGURE II. Combined System Separation Schedule .... 5 & 6

FIGURE III. Plat Showing Area Served by Combined Sewer Systems 8

Cover Photo by Abbie Rowe—Courtesy National Park Service

INTRODUCTION

The District of Columbia Water Pollution Control Plant* is a metropolitan facility treating the sewage from the District and extensive areas in Maryland and Virginia which are naturally tributary to the District of Columbia sewerage system, in all an area of approximately 725 square miles. Each jurisdiction pays a proportionate share of capital and operating costs.

But before the Water Pollution Control Plant can live up to its full potential, all the sewage that flows into the District's network of sewers must be delivered to the plant for treatment. This is not now the case. Significant amounts of sewage escape to the Potomac and Anacostia Rivers and Rock Creek during heavy rains. These overflows of raw sewage occur because of the existence of the combined system of sewers which serves the older portion of the District of Columbia.

These combined system sewers were constructed here, as in most large cities, before the need for water pollution control resulted in the development of modern methods of sewage disposal; and they must be converted to separate sewers, or other means of preventing this pollution must be found, before the Potomac River can be put to maximum use and enjoyment. This booklet describes how the District of Columbia Government is proceeding to achieve this difficult but highly desirable goal.

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*Formerly Sewage Treatment Plant.

COMBINED AND SEPARATE SEWER SYSTEMS

Combined sewer systems (See Figure 1) are networks of double-duty sewers. They receive a city's domestic and industrial wastes as well as the rainwater that drains into them from roofs, yards, areaways, and streets. In dry weather, wastes in these sewers are collected by interceptor sewers and delivered to the point of treatment which in Washingtion is the Water Pollution Control Plant located at Blue Plains, at the down-river tip of the District of Columbia. During rainstorms, this normal pattern of sewage disposal is disrupted. It is not feasible to build interceptors or water pollution control plants large enough to handle the great volumes of water and wastes that would be discharged to them during rainstorms. Therefore, combined sewer systems are provided with "relief points," or overflows, through which the excess flows of rainwater mixed with some sewage are discharged to the watercourses during storms.

Separate sewer systems consist of two entirely independent networks of sewers, one of which collects all domestic and industrial wastes and conveys them to interceptors draining only to the Water Pollution Control Plant. Storm run-offs flow into the other system of sewers and are discharged into the nearest watercourses.

The more recently developed areas of the District of Columbia, as well as the adjoining suburbs in Maryland and those in Virginia which are tributary to the District of Columbia System, are already served by separate sewer systems. The older sections of Washington, comprising approximately 40 percent of the District, are still served by the combined system (See Figure III). It is this area which is to be converted to the separate system under the District of Columbia's present and continuing anti-pollution program.

COMPARISON
OF SEWAGE COLLECTING SYSTEMS

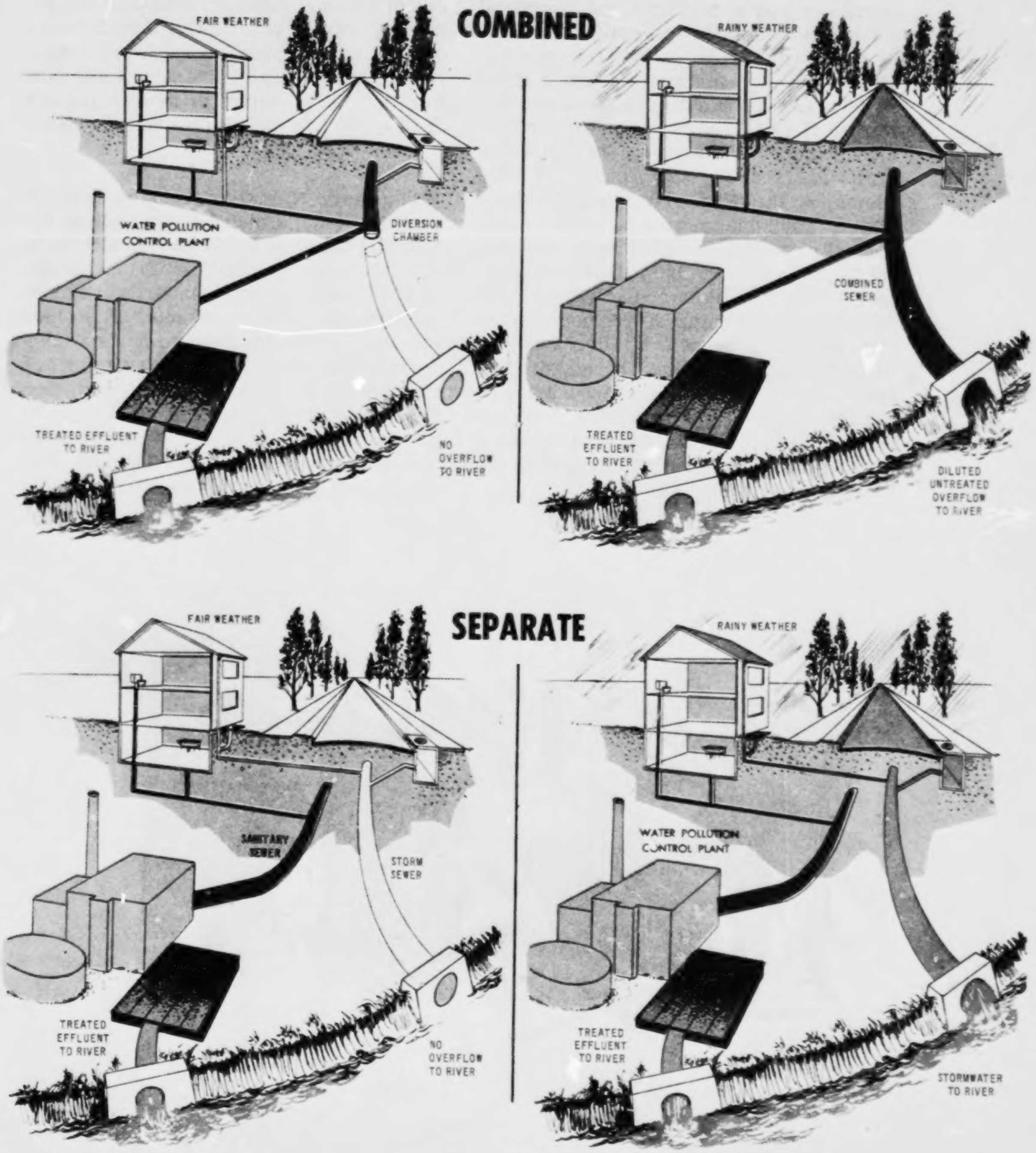

COMBINED
FAIR WEATHER
WATER POLLUTION CONTROL PLANT
DIVERSION CHAMBER
TREATED EFFLUENT TO RIVER
NO OVERFLOW TO RIVER
RAINY WEATHER
COMBINED SEWER
TREATED EFFLUENT TO RIVER
DILUTED UNTREATED OVERFLOW TO RIVER
SEPARATE
FAIR WEATHER
SANITARY SEWER
STORM SEWER
TREATED EFFLUENT TO RIVER
NO OVERFLOW TO RIVER
RAINY WEATHER
WATER POLLUTION CONTROL PLANT
TREATED EFFLUENT TO RIVER
STORMWATER TO RIVER

FIGURE I

REPORT OF BOARD OF ENGINEERS

Culminating a study of more than two and a half years, a board of engineers composed of eminent consultants with many years of experience in sanitary engineering, in 1957 outlined several alternate plans for abating or eliminating pollution resulting from the existing sewer system. The two proposals having the greatest merit were designated Project "A" and Project "C".

Project "A" would convert all combined areas to the separate system and provide interceptors to carry all sewage to the pollution control plant. With the work completed, there would no longer be any overflows of untreated sewage into the river at any time. However, no appreciable reduction of pollution in the river would result until substantially all of the project, estimated to cost $300 million, would have been completed. Minimum construction time required to complete Project "A" was optimistically estimated at twenty years.

Project "C" would convert about 10% of the combined system areas to the separate system (See Fig. III). For the time being, the remaining combined system sewers would continue to function as at present, except that new interceptors would be provided to carry additional quantities of domestic sewage mixed with rainwater to the Water Pollution Control Plant. Wet weather discharges to the river would still occur from these enlarged interceptors, but only during heavier rainfall and on a scale substantially below present volumes. Project "C" was estimated to cost $133 million, and could be completed in 10 years or less, depending on the availability of construction funds. The Board of Engineers recommeded Project "C" and the Distrcit adopted it with a few modifications.

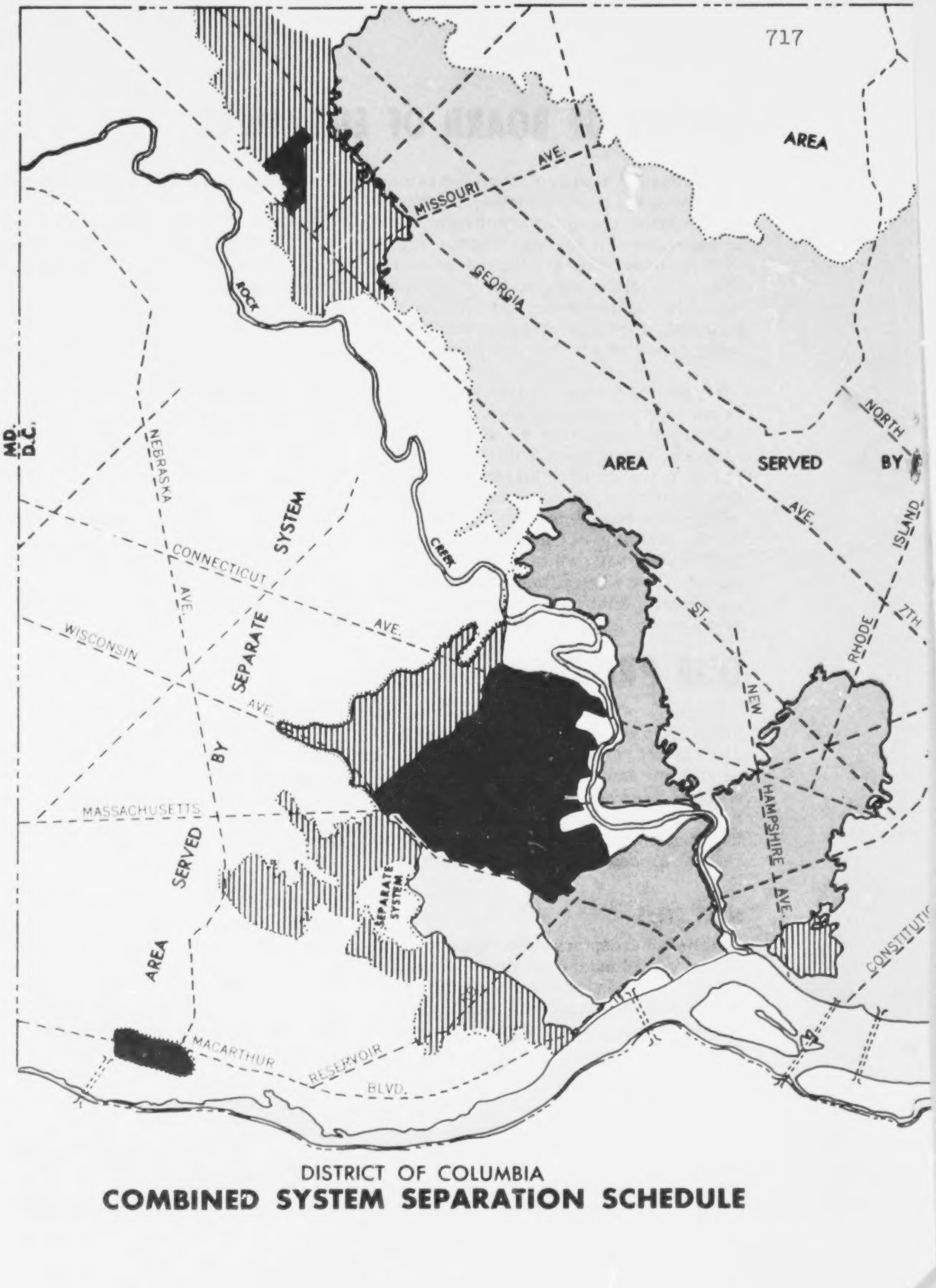
OUR PROGRAM

Because of the early benefits to be derived from the interceptors proposed under Project "C", the District initiated work on this project in 1957 and is proceeding as funds are available modifying some features of Project "C" in order to retain the long range goal of complete system separation, as contemplated in Project "A".

FIRST STEPS

Relief interceptors and pumping stations are currently under construction which are needed to expand the capacity of the District's system so that it can handle the volums of sewage generated in the city and in Maryland and Virginia suburban areas draining to the D.C. System. This program of improvements will form the backbone of any sewer system adequate for long range metropolitan service. In its essentials this system is substantially common to any and all plans for pollution control.

By modification of the Board's plan, all sewage originating upstream of Georgetown in Maryland, Virginia and the District will be handled by an interceptor serving only separate system areas. There will be no overflow points on this sewer. By further modification, sewage originating in



DISTRICT OF COLUMBIA
COMBINED SYSTEM SEPARATION SCHEDULE

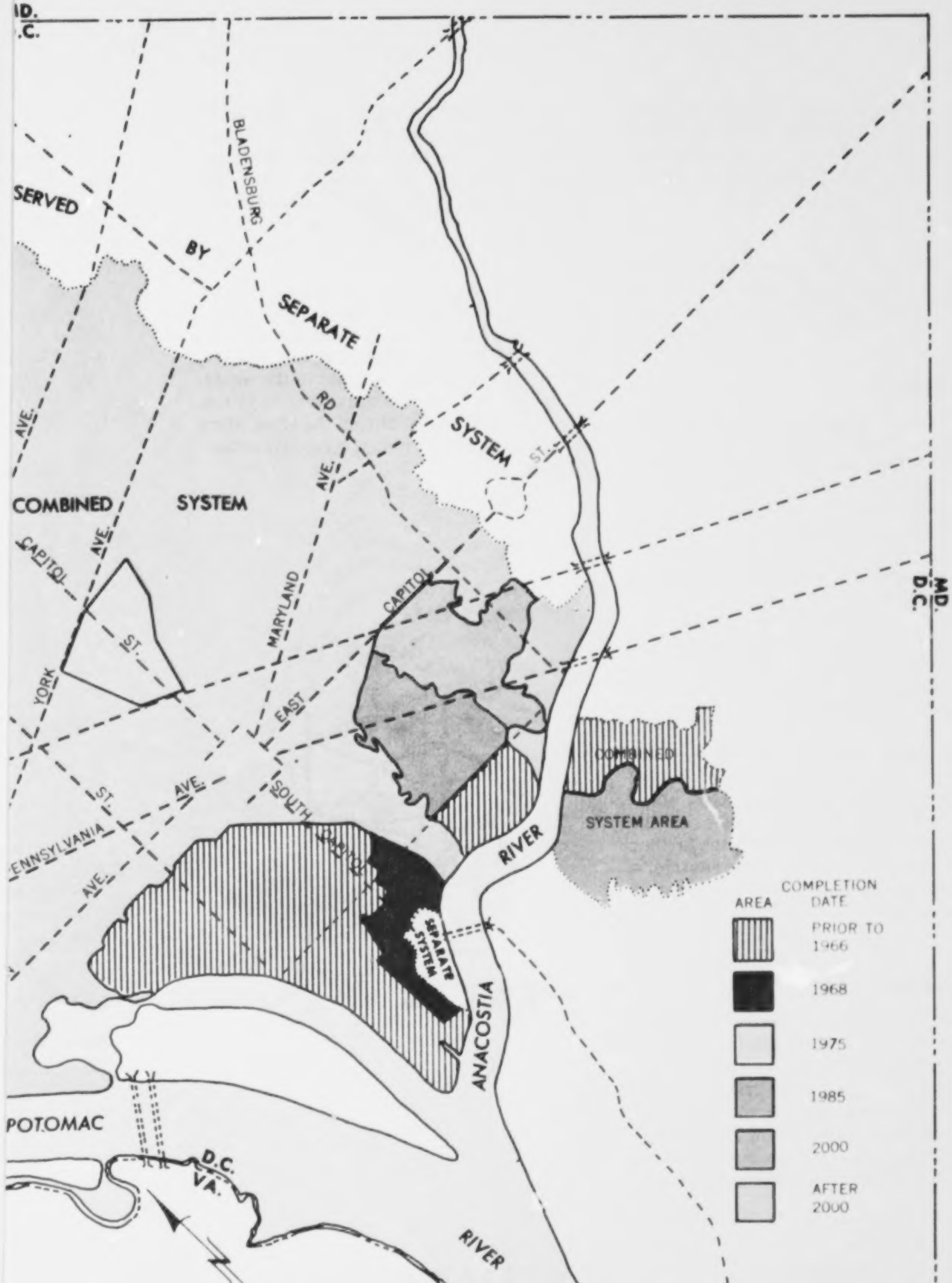

MD.
D.C.
SERVED
BY
SEPARATE
SYSTEM
BLADENSBURG
RD
AVE.
COMBINED
SYSTEM
ST.
AVE.
MARYLAND
AVE.
CAPITOL
ST.
YORK
AVE.
EAST
CAPITOL
PENNSYLVANIA
AVE.
ST.
SOUTH CAPITOL
COMBINED
SYSTEM AREA
SEPARATE SYSTEM
RIVER
ANACOSTIA
POTOMAC
D.C.
VA.
RIVER
MD.
D.C.
AREA
COMPLETION DATE
PRIOR TO 1966
1968
1975
1985
2000
AFTER 2000

FIGURE II.

Maryland and in separate service areas of the District in the Rock Creek watershed will also be confined to an "express" sewer, without overflow or relief between the points of origin and Water Pollution Control Plant.

In general, the District will undertake no expensive construction where it will not serve a significant function toward the eventual goal of total sewer separation.

EARLY BENEFITS

By virtue of the sizing of the Project "C" structures, considerable relief from the most objectionable aspects of mixed storm-sewage overflows will be attained at an early date. From this work we may confidently expect the Potomac to be clean as, or cleaner than, any other river which is similarly situated with respect to a major city. Upon completion of Project "C" the Potomac would receive no sewage contamination whatever through more than one-third of its transit through the limits of the District (from Chain Bridge to a point below Key Bridge).

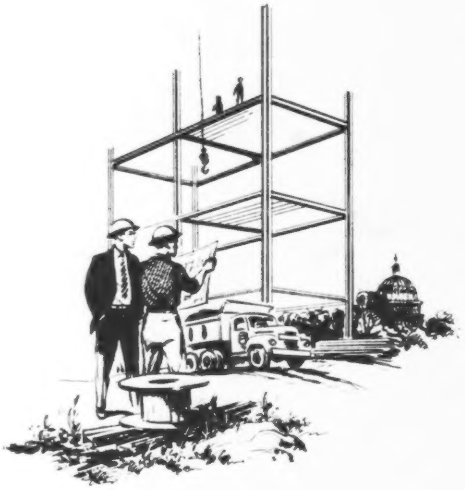
These early benefits will be enjoyed throughout the necessarily long period required for total separation. Also, completion of Project "C" will accelerate the day when the Potomac will reap the further benefits which will result as the District's continuing program of sewer separation moves ahead.

NEW PLUMBING CODE

On May 19, 1959, the District of Columbia amended its Plumbing Code to require all new buildings, of whatever size, to install separated plumbing systems. The same requirement covers all buildings undergoing major remodelling. Adoption of the new code is a significant step toward the accomplishment of system separation.

As new buildings replace old ones in the District—a continuing process—the percentage of buildings equipped with separated plumbing will steadily rise. By merely adopting the new Plumbing Code, the District has enlisted time as its ally in working toward system separation.

While construction proceeds on the projects scheduled for the years immediately ahead, the new Plumbing Code will be at work bringing about time and money-saving plumbing conversions in the areas scheduled for later separation. Thus the new code will bring closer the time when complete system separation can be accomplished.



PLAT SHOWING AREA SERVED BY COMBINED SYSTEM SEWERS

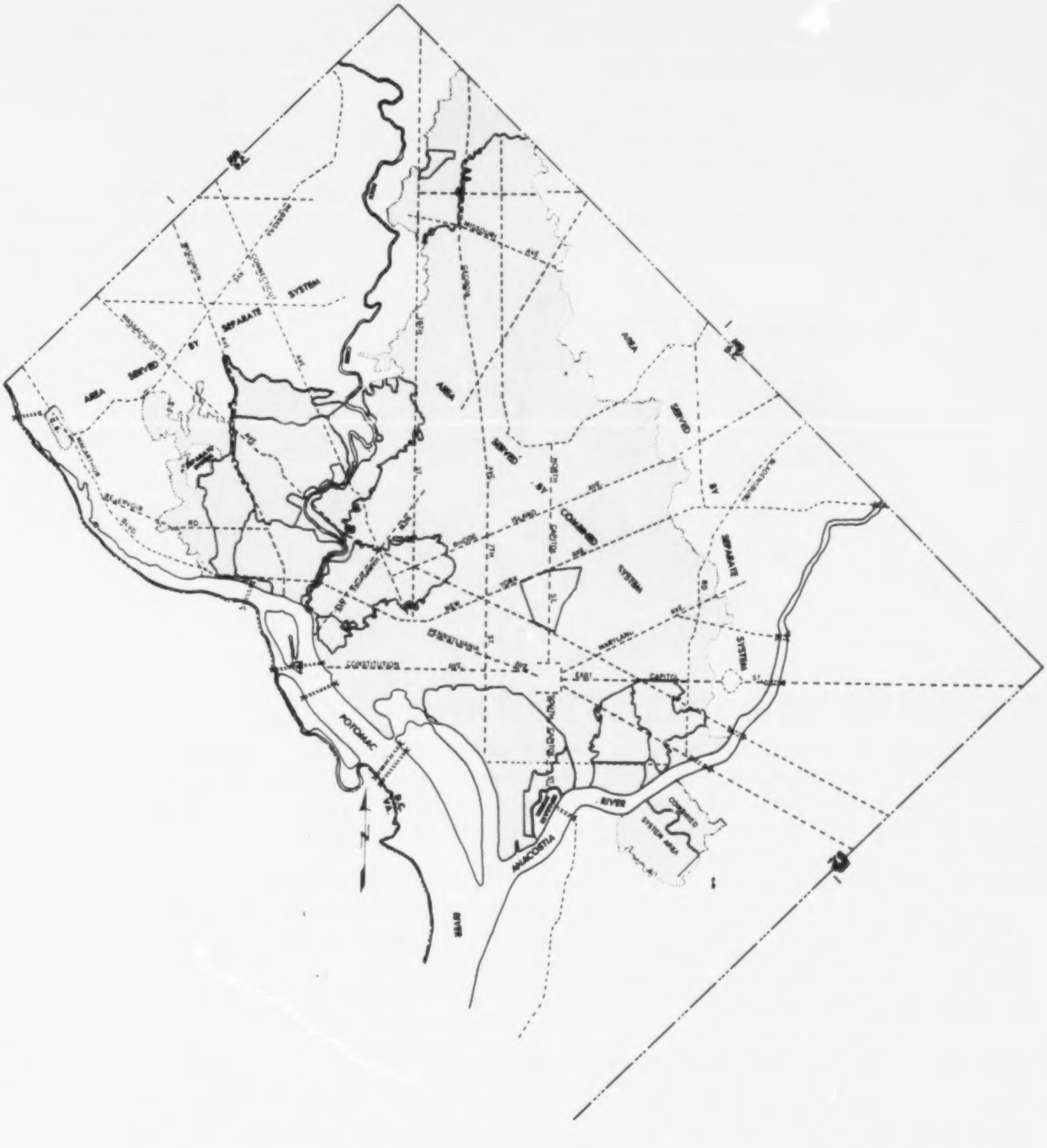

AREA SERVED BY SEPARATE SYSTEM
AREA SERVED BY COMBINED SYSTEM
AREA SERVED BY SEPARATE SYSTEM
CONSTITUTION AVE.
POTOMAC
RIVER
ANACOSTIA
RIVER
COMBINED SYSTEM AREA
N

FIGURE III

SEPARATION WORK COMPLETED PRIOR TO 1966

Prior to the recommendations contained in the Board of Engineers report of 1957, the separation of combined system sewers was begun in certain outlying areas of the District of Columbia.

In 1932, the first separation work was undertaken in the vicinity of MacArthur Boulevard and Arizona Avenue, N.W. Work continued in this and four other areas until the shortage of materials and man power, occasioned by the war, forced its deferment in 1942. Separate sewer systems had been provided for 375 buildings during this period.

Since work was resumed in 1960, approximately 1289 houses, apartment buildings or commercial buildings have been separated, and approximately 39.6 miles of sanitary or storm sewers have been constructed in streets or alleys.

COORDINATION WITH OTHER CITY PLANS

Every effort is being made to further the program of complete separation so as to accomplish our goal with the least inconvenience to the public and at the lowest possible cost. Among the means to be employed in achieving this aim will be:

1. Locating interceptors and major trunk sewers within limits of new highways and thereby eliminating the heavy cost of repairing pavement cuts.
2. Constructing separate system sewers in advance of scheduled street paving, in some cases even in areas where system separation cannot be completed for a number of years. This will result in construction economies and will avoid later traffic disruptions.
3. Constructing necessary extensions or replacements of sewers in present combined system areas so as to facilitate eventual separation.
4. Coordinating our program with redevelopment by public and private agencies on such projects as
   - a. Urban Renewal
   - b. Pennsylvania Avenue Plan
   - c. Federal Office Buildings
5. Making the services of our planning staff available for consultation with various Federal agencies engaged in erecting buildings in the District. All such groups have agreed that work handled by them would be provided with separate plumbing systems.

TIMETABLE FOR SYSTEM SEPARATION

This phase of the District's program is planned to provide maximum benefits to the Potomac at the earliest possible date. Costs will be kept to a minimum by making full use of existing facilities and by coordinating new work with highway construction, redevelopment operations and other public and private improvements.

Stages of doing the work are shown on Figure II.

Stages indicated constitute a program practicable of attainment by the year 2000.

STAGE I.

CONNECTICUT - CLEVELAND - MASSACHUSETTS AVENUES - NORMANSTONE DRIVE. Sewer construction and separation of plumbing was started in 1964 and system separation of the entire area is scheduled for completion in 1968.

LUZON VALLEY. System separation in this area has been substantially completed with the exception of a small area south of Walter Reed Hospital.

POTOMAC HEIGHTS. Sewer construction has been completed and a majority of the buildings have been converted to separate system.

SOUTHWEST. This area is outside the Southwest redevelopment area. Construction of sewers and separation of plumbing was started in 1964 and further work will be scheduled in coordination with paving schedules and new building construction.

STAGE II.

COLLEGE POND. Initial sewer construction was started in 1960 in the grounds of Georgetown University. Construction of street sewers above the University will be started in 1966 together with plumbing separation.

NORTHWEST NO. 1 - NORTHEAST NO. 1. System separation in these urban renewal areas will be coordinated with highway paving schedules and new building construction.

STAGE III.

ANACOSTIA. Upon completion of system separation in this part of Anacostia, the entire area of the District east of the Anacostia River will be separate system.

SOUTHEAST. Separation in this area will be coordinated with anticipated redevelopment activity adjacent to the Southeast Freeway.

EAST ROCK CREEK. This area on the east side of Rock Creek, between Massachusetts Avenue and Piney Branch Parkway, is scheduled for system separation by 1985.

STAGE IV.

The following listed areas are scheduled for complete separation by 2000.

SLASH RUN. The construction of major trunk sewers has been continuing since 1960 chiefly in advance of or conjunction with highway construction in the Foggy Bottom and West End areas of the city. The rapid redevelopment of private property may result in complete separation sooner than 2000.

GEORGETOWN - WEST ROCK CREEK. Separation in these areas will be difficult and costly since little rebuilding of private properties is anticipated.

SOUTHEAST. Separation in this area will be coordinated with anticipated redevelopment activity adjacent to the Southeast Freeway.

STAGE V.

Areas listed for "after 2000" may be undertaken sooner, depending upon other improvement programs and the availability of funds.

Footnote to 1966 Edition

The recent upsurge of interest in water resources conservation and development is based on a very real and ever growing crisis which is national in scope and which, in some local areas, has reached critical proportions. On the occasion of his signing of the Water Quality Act of 1965, President Johnson said, "The hour is late, the damage is large..." "With the signing of the Water Quality Act of 1965 this morning, I pledge you that we are going to reopen the Potomac for swimming by 1975. And within the next 25 years, we are going to repeat this effort in lakes and streams and other rivers across this country."

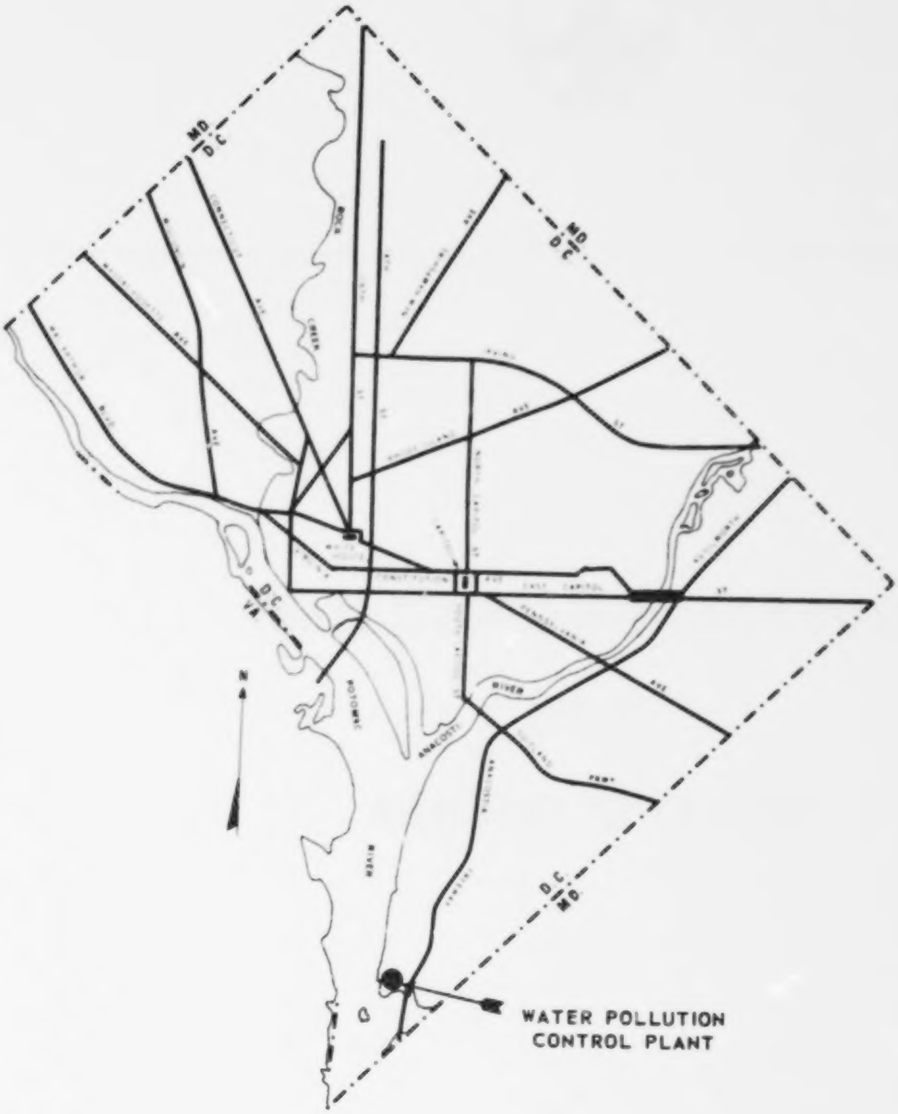
The above referenced Act provides substantial financial assistance for research and development of new methods of controlling wastes from combined system sewers.

In view of the excellent cooperation of the individual property owners of the District of Columbia and with due regard for necessary coordination with highway building and urban renewal programs, the District Government is optimistic regarding the achievement of its Sewer Separation Program.

WATER POLLUTION CONTROL PLANT
OF THE
DISTRICT OF COLUMBIA

DEPARTMENT OF SANITARY ENGINEERING
DISTRICT OF COLUMBIA GOVERNMENT

MARCH
1967



LOCATION OF
WATER POLLUTION CONTROL PLANT
IN DISTRICT OF COLUMBIA

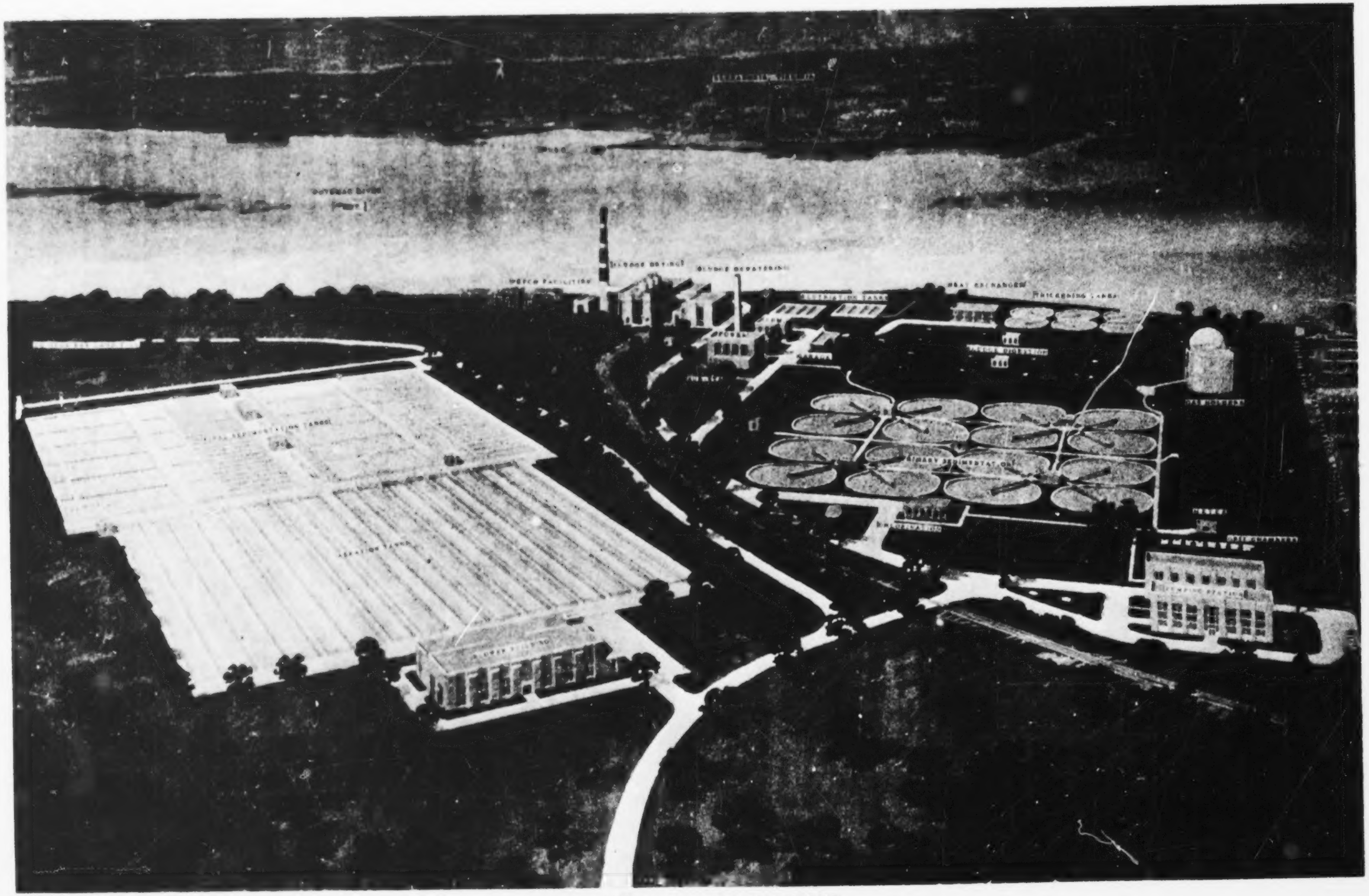
726

GOVERNMENT OF THE DISTRICT OF COLUMBIA

DEPARTMENT OF SANITARY ENGINEERING

WATER POLLUTION CONTROL PLANT OF THE DISTRICT OF COLUMBIA

MARCH
1967



WATER POLLUTION CONTROL PLANT

WATER POLLUTION CONTROL PLANT OF THE DISTRICT OF COLUMBIA

TABLE OF CONTENTS

Page

INTRODUCTION 1

DESCRIPTION OF PROCESS 6

SEWAGE TREATMENT
- Sewage Pumping 6
- Screening 6
- Grit Removal 6
- Metering 7
- Primary Sedimentation Tanks 7
- Blower Plant 7
- Aeration 8
- Final Sedimentation 8
- Chlorination 8
- Disposal 9

SLUDGE TREATMENT
- Thickening 9
- Digestion 9
- Elutriation 10
- Vacuum Filtration 10
- Drying and Incineration 11
- Disposal of Sludge and Ash 11
- Gas Production and Utilization 11
- Power Plant 11

APPROXIMATE CAPITAL COSTS 13

APPROXIMATE ANNUAL OPERATING COSTS 13

ILLUSTRATION

Reproduction of Architectural Rendering of the District of Columbia Water Pollution Control Plant . . . . Frontispiece

Major Areas Expected to Discharge Sanitary Sewage to the District of Columbia System 3
Flow Diagram 4
Process Diagram 5

WATER POLLUTION CONTROL PLANT OF THE DISTRICT OF COLUMBIA

INTRODUCTION

Prior to 1938, dilution in the Potomac River was the only treatment given to sewage from the District of Columbia. This method of disposal had its beginning about 1840, when the first water-carried domestic wastes entered the then existing storm sewer system. With the further construction of sewers, the installation of a new water supply system in 1859, and the advent of the Civil War, larger quantities of these wastes were carried to the river. The loading was beyond its assimilative capacity. This resulted in extremely offensive conditions along the waterfront of the city, creating serious hazards to the health of residents.

In 1889 the river had become so obnoxious that President Harrison, under authority of Congress, appointed a board composed of three outstanding sanitary engineers of the time, Messrs. Rudolph Herring, Samuel M. Gray and Frederick P. Stearns, to study the situation and recommend steps to be taken to provide the city with an adequate sewerage system. One of the objectives of this study was to find a point of discharge that would provide adequate dilution, situated far enough downstream to prevent tidal action from returning the sewage to the environs of the city. To a great extent the existing sewerage system is based on the recommendations of this report. At that time the population was approximately 280,000 persons. In their report, the engineers estimated that there was sufficient dilution volume in the Potomac to handle a population of 500,000 persons, forecast for the year 1927.

As this population was approached in the early 1930's, the situation became very similar to that existing in 1890, although it was less severe. In order to alleviate the condition, a board of engineers, composed of Harrison P. Eddy, John H. Gregory and Samuel A. Greeley, was engaged to study and report on sewerage and sewage disposal for the District of Columbia. This study was completed in 1933. In anticipation of the need for a treatment plant, the District had acquired a site at Blue Plains in 1919. With funds made available through the Federal Public Works Program (70% Loan to the District of Columbia — 30% U.S. Grant), construction of a water pollution control plant, based on the studies of this board, was begun in 1935 at Blue Plains, District of Columbia. This plant was designed to handle an average sewage flow of 130 mgd. (million gallons per day) from a population of 650,000 persons. It was put in operation in 1938, providing primary treatment consisting of grit removal, grease separation (now eliminated), and plain sedimentation. Solids (sludge) removed from the sewage are treated by digestion, elutriation (washing), and dewatering. Since the beginning of operations, dewatered digested sludge has been used by individuals and governmental agencies as a soil conditioner. For some years excess sludge was shipped to the District Penal Institution farms near Lorton, Virginia.

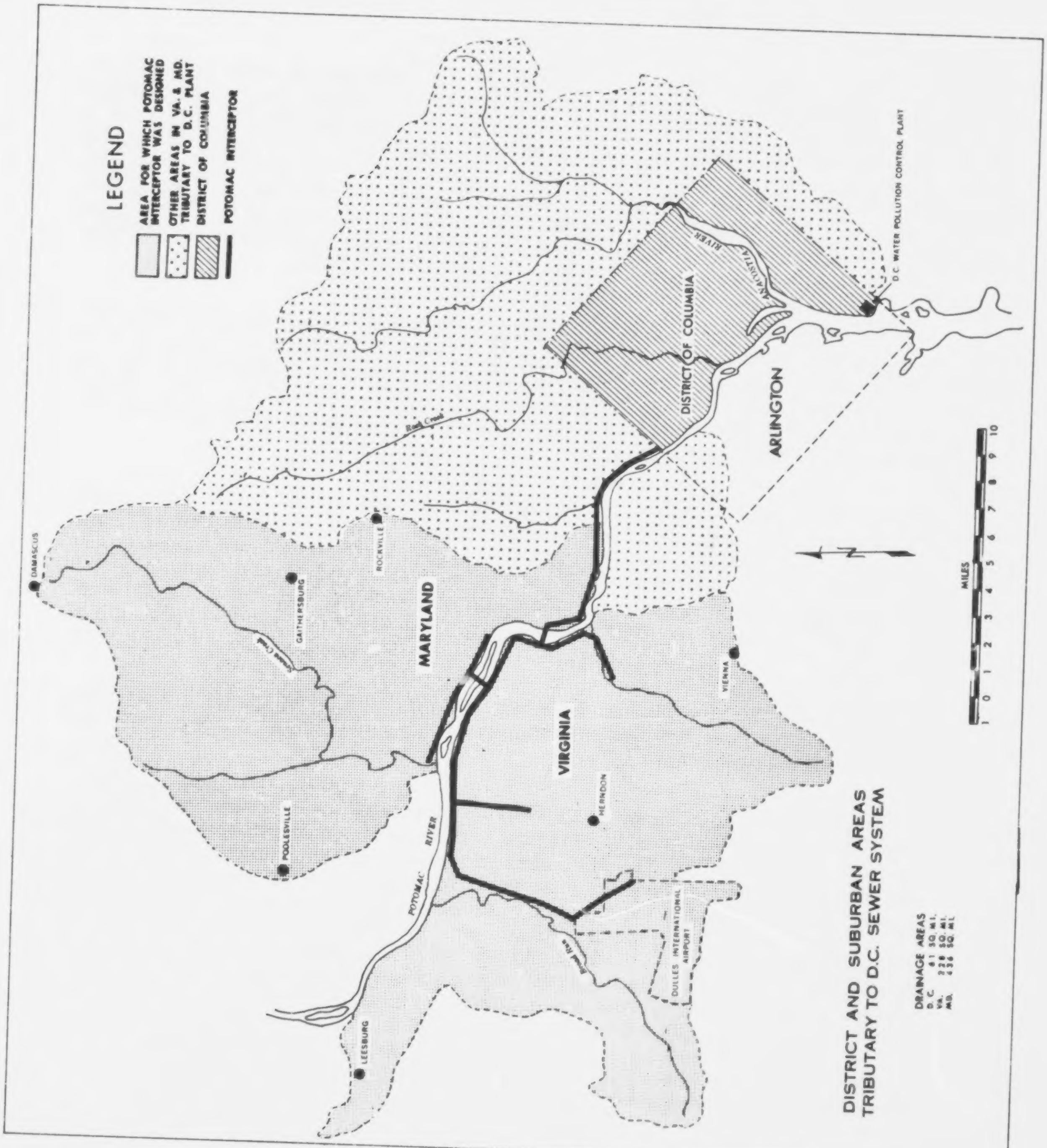
At the time the primary plant was built, it was thought to be adequate for approximately 15 to 20 years. The second World War brought abnormal increases in population, and the capacity of the original design for 650,000 persons was exceeded earlier than expected. Although plans were initiated to relieve the situation, actual construction of the necessary additions was not begun until 1949, because of the shortage of materials and funds over the war years. Beginning in 1949, the plant was expanded to handle an estimated flow of 175 mgd. from a design population of 975,000 persons. These additions included four primary sedimentation tanks and four sludge digestion tanks.

With these improvements in place, the primary plant achieved approximately 50% reduction of suspended solids, and about 30% reduction of BOD (biochemical oxygen demand), a commonly accepted measure of organic pollution. These reductions were achieved on raw sewage of about 163 mgd. average flow, containing 164 ppm. (parts per million) of suspended solids and approximately 142 ppm. of BOD.

In the early years of World War II, it became apparent that the primary plant, even with the needed additions in place, would be inadequate, and that conditions in the Potomac River would grow worse with future increases of population in the metropolitan area. Planning for secondary treatment, under way during the war years, proceeded with increased activity beginning in 1949, and resulted in the program of additions which went into initial operation in 1959.

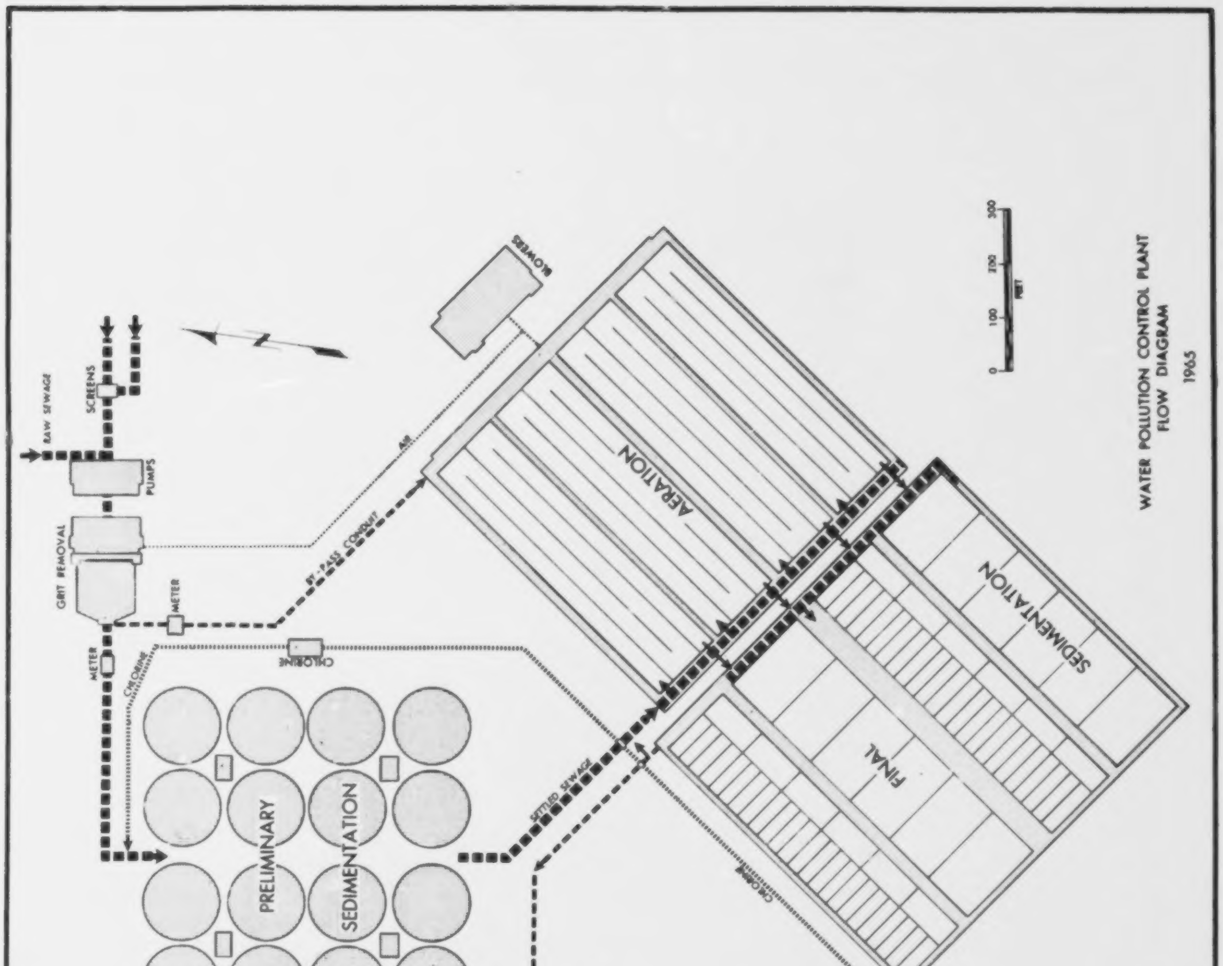
Other construction during the period 1953-1955 included chlorination facilities, providing pre- and post-chlorination, and a drying and incineration plant for the disposal of sludge.

Rapid population growth in nearby Maryland areas contributing to the District of Columbia sewerage system, and the decision of authorities in nearby Virginia to utilize the District's facilities, hastened this development. As indicated on the map on Page 3, large areas of Maryland and Virginia are, or will shortly be, tributary to the District of Columbia sewerage system. On the basis of comprehensive agreements, made with the Washington Suburban Sanitary Commission in 1954 and Fairfax County in 1959, provisions were made in the design of the plant additions to accommodate sewage flows from areas in Maryland and Virginia. As a consequence, these jurisdictions are, or will, bear a substantial portion of the cost of the current improvements. In addition, they pay the District a "rental" charge for their proportional use of existing facilities, both plant and sewer system, as well as their share of operating and maintenance costs.



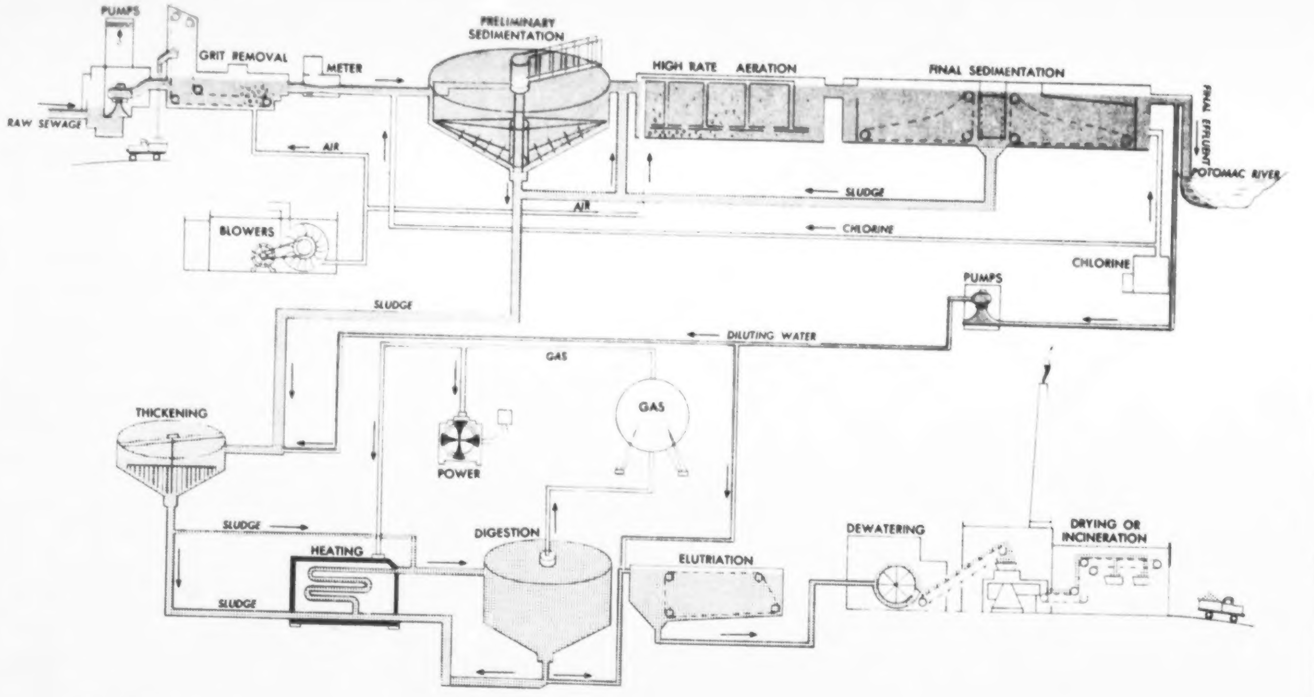
DISTRICT AND SUBURBAN AREAS TRIBUTARY TO D.C. SEWER SYSTEM

DRAINAGE AREAS
D.C. 61 SQ. MI.
VA. 228 SQ. MI.
MD. 436 SQ. MI.



WATER POLLUTION CONTROL PLANT
FLOW DIAGRAM
1965

DESIGN DATA
1,791,000 POPULATION
290 M.G.D MAXIMUM SUMMER MONTH



DESIGN DATA
1,791,000 POPULATION
290 M.G.D MAXIMUM SUMMER MONTH

1965

WATER POLLUTION CONTROL PLANT
PROCESS DIAGRAM

DESCRIPTION OF PROCESS

To illustrate the methods by which the wastes from the District of Columbia and contributing areas in Maryland and Virginia are treated and rendered suitable for disposal in the Potomac River, a brief description of the process by units follows. Reference to the Flow Diagram and Process Diagram on Pages **4** and **5** will be helpful.

The treatment process in general is one which provides grit removal, pre-chlorination, sedimentation, aeration of the settled sewage, final sedimentation, accompanied by digestion, elutriation, and dewatering of sludge removed in the process. The effluent from final sedimentation is chlorinated and discharged to the Potomac River. The treated sludge may be used as a fertilizer base, soil builder or top dressing, or incinerated, with the residue disposed to a land fill.

SEWAGE TREATMENT

Sewage Pumping

In order to collect the water-borne wastes from a region by gravity, interceptors and trunk sewers are generally laid in the valleys of streams where advantage of the existing topography may be taken to provide sufficient slope. In order to avoid extremely deep sewers, particularly in flat country near the terminals of the interceptors, pumping stations may be necessary to move the sewage to the point desired. Such is the case at the Main Sewerage Pumping Station at the foot of New Jersey Avenue, S.E., the Poplar Point Sewage Pumping Station, and the Blue Plains Water Pollution Control Plant, where the sewage does not enter these installations at a sufficient elevation to provide flow by gravity. The Blue Plains Pumping station has a present capacity of 400 mgd; consisting of 1-40 mgd., 2-60 mgd. and 3-80 mgd. mixed-flow type pumps.

Screening

Prior to reaching the Water Pollution Control Plant, all sewage is screened at one of five locations: Main Sewerage Pumping Station, O Street Pumping Station, Poplar Point Pumping Station, Barry Road Screening Station, and Oxon Run Screening Station. At each of these locations, mechanically cleaned screens having 1-inch clear bar spacing are installed. The screenings accumulate and drain on the floor, are transferred in perforated GI cans to a covered truck, and are then hauled to a land fill for burial.

Grit Removal

Granular materials such as silt and sand are brought into the system primarily through the combined sewers existing in parts of the District of

Columbia. Grit will damage pumps by abrasion and interfere with the operation of sedimentation tanks and sludge handling units. Eight channels designed to reduce the rate of sewage flow to one foot per second, allowing the grit to settle out, were provided in the original plant. However, fluctuations in the volumes of sewage passing through the channels resulted in varying qualities and quantities of grit being removed. In 1959, four aerated grit channels were built to replace the original eight conventional channels. Air is injected a few feet above the floor of the channel. The rolling action of air keeps the lighter organic matter in suspension and allows the grit, relatively free from organic matter, to be deposited in the quiescent zone below the zone of air diffusion. The effect of flow-through velocity is reduced and the quality of grit is more consistent. The four chambers, each 20 feet wide, 75 feet long, with a liquid depth of 11 feet, provide a detention time of about 2.5 minutes at a maximum flow of 375 mgd. Collector equipment has a capacity for removal of 50 cubic yards in a twelve hour period.

Metering

The rate of sewage flow from the grit chamber to the primary sedimentation tanks is measured by a 9' Venturi meter with a 4'-6" throat, having a registering capacity of 300 mgd. The flow rate is transmitted to indicators in the pumping station, grit chambers, chlorination building, and to the administration building where it is recorded and integrated. A larger Venturi meter with a capacity of 400 mgd. is located between the primary tanks and the aeration tanks. This flow rate is indicated in the blower building, the tunnel access building, at three locations in the final tank tunnel and is recorded and integrated in the south control building. Impulses from these meters actuate four automatic sewage samplers which composite a 24-hour sample in proportion to the flow. These samples are analyzed daily for suspended solids, biochemical oxygen demand and other variables. The results serve as parameters for control.

Primary Sedimentation Tanks

Following metering, the sewage flows into sixteen round tanks, each 106 feet in diameter and 14 feet deep having a capacity of 930,000 gallons. Twelve tanks were completed in 1936 and four in 1951. This provided approximately 1.3 hours detention time at a flow of 290 mgd. and permits capture of the settleable solids, referred to as raw or primary sludge. (Flow in excess of the primary plant capacity may be by-passed directly into the aeration tanks. This conduit is provided with its own Venturi meter). Dissolved and non-settleable solids are carried in the overflow to secondary treatment.

Blower Plant

Air for the high-rate aeration secondary treatment process is furnished from the blower plant. The blower building houses four blowers to serve the aeration plant, and is so designed that an additional bay can be added later. The structure is 80' by 158' in plan, having two stories and a basement.

Each of the four motor-driven blowers has a capacity of 40,000 cu. ft. per min. at 7.5 lbs. per sq. in. The motors are of the squirrel-cage type, 1,750 horsepower each, operating at 3,550 revolutions per min. and 4,160 volts. The blowers are of the centrifugal type. With three of the four units in operation, the capacity is sufficient to supply 0.6 cu. ft. of air per gallon for 290 mgd. of sewage. The four blowers provide air for this quantity of sewage at 0.8 cu. ft. per gallon.

Aeration

In this "secondary" process, biological growths are produced within the sewage, which is kept aerobic under carefully controlled conditions by having air diffuse into it as the sewage passes through the treatment tanks. The presence of great numbers of highly active aerobic bacteria is depended upon for removal of the finely-divided suspended material and dissolved organic material from the settled sewage. A part of the formed floc from the effluent is returned to the influent as "activated" sludge, to create a higher concentration of floc in the treatment unit. The biological action proceeding under these conditions continuously restores the active contact surfaces of the sludge floc. The process is operated as high-rate activated sludge (modified aeration) which is accomplished by controlling the air supply, the aeration period and the amount of returned sludge. As a result of the bacterial action previously mentioned, suspended solids and biochemical oxygen demand are further reduced and additional stabilization of the sewage occurs. The aeration tanks provided for this purpose have four channels, each of which is 29' wide, 460' long and 15' deep and is equipped with a system of air diffusers. The effective total volume of the four tanks is 3,080,000 cubic feet, which together with 320,000 cubic feet provided in the aerated conduits makes a total of 3,400,000 cubic feet available for aeration. This provides a displacement period of 2 hours at 305 mgd. (290 mgd. plus 5% return sludge).

Final Sedimentation

Flocculent masses formed in the aeration tanks are removed in the final sedimentation tanks. These twelve tanks, each 80' wide, 250' long and 12' deep provide approximately two hours detention time. Part of the captured sludge is returned to the aeration tanks as described above. Excess or "waste" sludge is pumped from the system to the thickening tanks preliminary to digestion.

Chlorination

To ensure that few pathogenic bacteria survive the sewage treatment operation, chlorine may be applied to the effluent from the final sedimentation tanks in its passage to the Potomac River. A point of introduction of chlorine is also provided between the grit chamber and primary sedimentation tanks. This is to provide odor control by oxidizing the sulfides that have been produced in the sewage during its long travel to the plant. Capacity of 30,000 pounds of chlorine per day is provided, which will permit a dosage of about 12 ppm. on a design flow of 290 mgd.

Disposal

Plant effluent flows through twin outfall conduits, each 90-inches in diameter, to the channel of the Potomac River to provide maximum dispersion. These conduits are considered adequate for a flow of 400 mgd. at a river elevation of 3.6'.

SLUDGE TREATMENT

Thickening

Sludge captured in the primary sedimentation tanks and excess sludge from the aeration process is mixed with diluting water taken from the plant effluent and introduced to the thickening tanks, where gentle stirring is provided to promote concentration. Six tanks, each 65 feet in diameter and 10 feet deep are in operation. Overflow from these tanks is returned for further treatment to the influent of the plant just ahead of the primary sedimentation tanks. Thickened raw sludge, containing between 7.5% and 10.0% solids, is drawn continuously from the thickening tanks.

Digestion

The chief function of the digestion tanks is to provide favorable environment, time, and space necessary to allow bacteria to utilize the organic material in the raw sludge as a source of food. In using this food supply these anaerobic bacteria, which function in the absence of dissolved oxygen, accomplish the decomposition of putrescible matter and partially stabilize the sludge. The decomposition is accompanied by production of gas, reduction of solids, and release of moisture. The gases produced are principally carbon dioxide and combustible methane. The methane is used as a fuel to produce power and heat.

Sludge from the thickening tanks passes to the digesters, after being mixed with sludge from the bottom of the digesters which has passed through external heat exchangers. Three 5,000,000 British thermal units per hour boilers, using sludge-gas as fuel, provide heat for the six 3,000,000 British thermal units per hour heat exchangers. The sludge temperature is raised to 103°F. As an alternate method, the thickened sludge may be first mixed with digested sludge before passing through the heat exchangers. This recirculation aids in producing a more thoroughly mixed sludge and permits a higher rate of loading of the digesters. Stabilized sludge withdrawn for disposal from the bottom of the digesters is treated further by elutriation and dewatering.

The existing digestion capacity consists of 12 fixed-cover tanks, each having a liquid volume of 142,500 cubic feet, with a total volume of 1,710,000 cubic feet. Each tank is equipped with internal mixing equipment and an external circulating pump. In four of the tanks, proprietary types of mixers are being used in an effort to compare relative effectiveness in producing homogeneity of tank contents with minimum maintenance and freedom from trash and scum accumulation.

Careful control of these operations, along with proper sludge agitation, assures utilization of nearly the entire volume of the digestion tanks and hence leads to lessened tank-volume requirement. Accumulations of grit and debris must be removed routinely. It is anticipated that the 12 existing digestion tanks will be adequate until 1980. The volume provided in these tanks will ensure a safe loading of about 8 pounds of total solids per cubic foot per month, based on the above described "high-rate" digestion. The estimated load to the digesters for 1980 is 342,000 pounds per day of raw dry suspended solids with an estimated maximum month of 459,000 pounds daily.

Elutriation

The digestion process described above results in numerous alkaline by-products. These interfere with solids compaction and impose a high demand for conditioning chemicals prior to vacuum filtration. By washing or "elutriating" the sludge, the alkalinity, and consequently the chemical requirement, is reduced. Plant effluent is used for this purpose. Four elutriation tanks were built in the period of 1935 to 1937 as a part of the original primary treatment plant. Two new tanks each 70' long, 32' wide, 11'6" deep, with a combined volume of 50,000 feet, were completed in 1961. The six tanks have a total volume of 100,000 cubic feet. Sludge and scum collectors, as well as rotary spray nozzles to break scum, have been provided. Piping arrangements for these tanks are such that they may be operated in series or in parallel with the original tanks. Alkalinity of the digested sludge is reduced from over 3,000 ppm. (as calcium carbonate, CaCo3), to about 600 ppm.

Vacuum Filtration

The elutriated sludge is pumped to chemical-conditioning tanks where polymers are added. The conditioned sludge flows into pans, in which large drums rotate slowly. The drums are covered with wool nylon cloths which act as filters, permeable to moisture but not to the solids. As the drums rotate into the sludge, a vacuum is created internally, drawing filtrate through the cloth and forming a coating or cake of sludge on the surface. The drums continue to rotate under vacuum until at a discharge point, a burst of compressed air is applied and the sludge cake falls onto a conveyor belt. The belt carries the sludge to trucks or to the drying process.

Existing equipment includes 4 vacuum filters, each 14' long and 11'6" in diameter with a filtering area of 500 square feet. Auxiliary equipment consists of vacuum, filtrate, and sludge pumps, chemical storage and feeding facilities, sludge-cake conveying and weighing equipment, necessary piping and valves. It is anticipated that with operation at rated capacity of 5 dry pounds per square foot per hour, the existing equipment will suffice until after 1970.

Drying and Incineration

Sludge to be used for commercial purposes is usually dried to less than 10% moisture. Heat-drying also precedes the use of sludge as a fuel for sludge drying or incinerating. The present plant equipment for this purpose consists of three flash-drying and incinerating units, each with a rated capacity to evaporate 12,000 pounds of water per hour. This unit capacity is sufficient to dry 208 tons of filter cake per day (24-hours) from 71% to 6% moisture content. Each of the three units operating as an incinerator has a rated capacity of 190 tons of 71% moisture sludge cake for 24-hours, making a total capacity of 570 tons. The capacity of this equipment is considered to be adequate until 1980.

The storage capacity of 54,000 cubic feet will hold 675 tons of dried product of 6% moisture content and unit weight of 25 pounds per cubic foot. This provides 6 1/2 days storage based on the average annual quantity of dried solids estimated for 1980.

Disposal of Sludge and Ash

The current market for dried sludge does not warrant the operation of the drying equipment. If conditions are favorable in the future, the dry product will be sold as a fertilizer base. At present, the dewatered sludge cake is trucked to a storage area where it is mixed with soil and passed through a shredder. Lime is added to reduce odors. The mixture is used by various government agencies and individuals on grounds and gardens throughout the metropolitan area.

When the incineration process is utilized, the residue is an inert ash and may be deposited as land fill without nuisance.

Gas Production and Utilization

Sludge gas consisting principally of methane and carbon dioxide is produced in the sludge-digestion process. Part of the sludge gas is utilized in generating electrical energy which is used at the plant, in the external heat exchangers for heating the digesting sludge, and in providing fuel for the central heating system. The balance is burned to waste or sold to the Naval Research Laboratory for use in their heating plant.

Power Plant

The Power Plant Building houses a 1,200 horsepower, sludge-gas engine with a direct-connected 800-kilowatt generator which, during the fiscal year 1958 (before addition of aeration load), produced about 65% of the total power used by the plant. Of 7,895,500 kw-hr. (kilowatt-hours) total consumption, the quantity purchased from the local utility was 2,791,000 kw-hr. However, with present energy consumption of nearly 33,000,000 kw-hr. per year, the generator produces only 10% of the total load. Space is provided in the existing building for additional units and studies of the feasibility of increasing generating capacity are in progress.

Hot gases from the engine exhaust through a heat exchanger to supply steam heat for the plant buildings. The engine jacket water may be circulated through heating coils within the sludge digestion tanks to supplement the external heat exchangers. Sludge gas is used as fuel for two gas-fired boilers in the power plant to provide additional building heating capacity.

APPROXIMATE CAPITAL COSTS

Primary Treatment Through 1953	$ 4,900,000
Drying and Incinerating	2,300,000
Chlorination	700,000
Secondary Treatment and Recent Improvements	15,100,000
High Rate Digestion	2,200,000
Total	$25,200,000

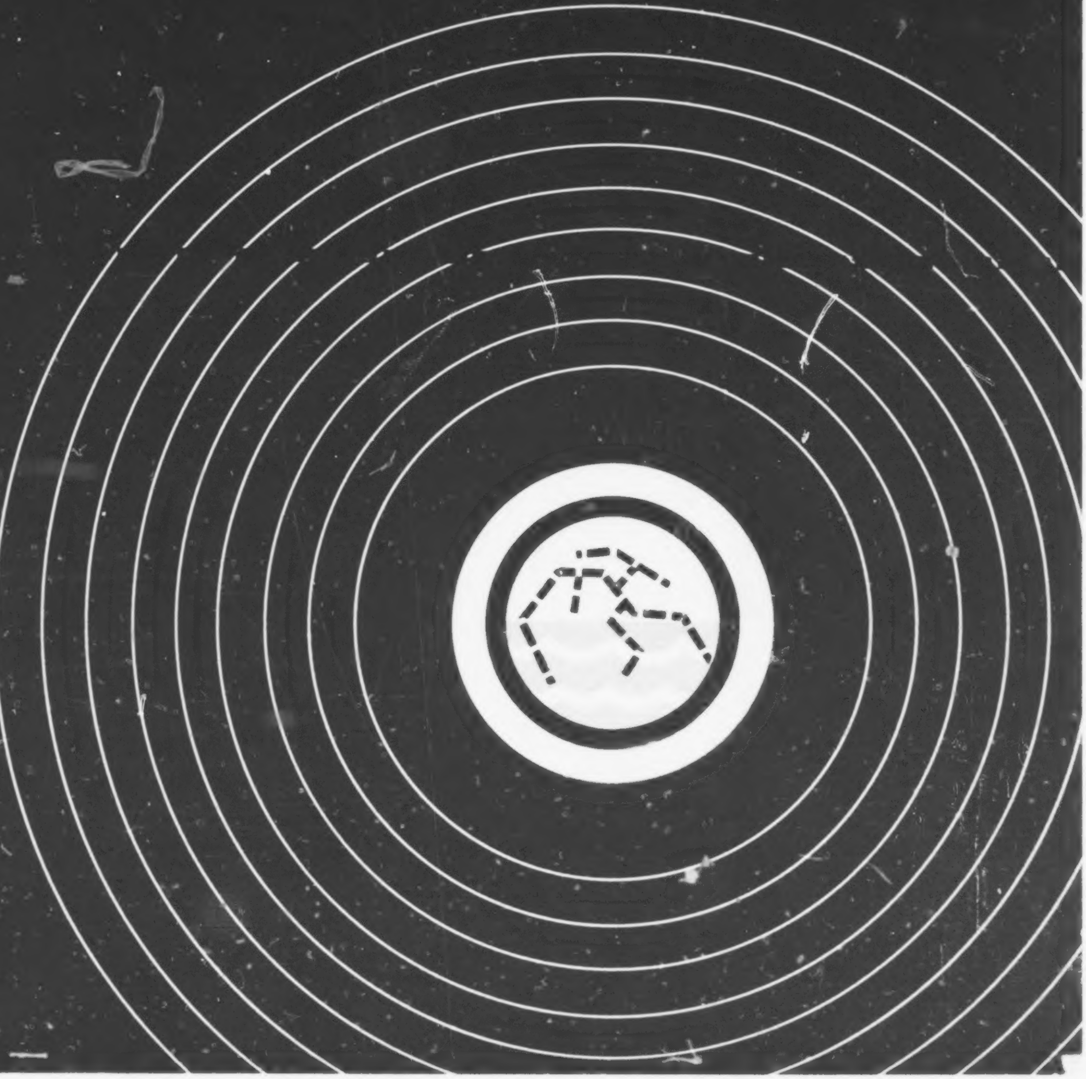
APPROXIMATE ANNUAL OPERATING COSTS

Personal Services	$ 1,576,000
Materials and Supplies	322,000
Electrical Energy Purchased	415,000
Equipment	113,000
Miscellaneous	20,000
Total	$ 2,446,000

Approximately 255 persons are employed in the operation and maintenance of the plant.

741

POTOMAC INTERCEPTOR



Page 2 THE METROPOLITAN ENVIRONMENT

The beginnings of one of the nation's great metropolitan centers.

4 THE RIVER

The Potomac River—an invaluable resource to the Nation's Capital and its environs.

6 THE DILEMMA

A threat to the continued suitability of the Potomac for metropolitan water supply.

8 THE DECISION

Coalescence of federal, state and local governmental efforts to protect the Potomac—Potomac Interceptor authorized.

12 PLANNING

Metropolitan cooperation in the translation of an idea into a reality.

24 TO THE DISTRICT LINE – THEN WHAT?

The essential link to fulfillment.

26 DESIGN AND CONSTRUCTION

The problems of time, location and after-effects all have solutions.

34 USER ARRANGEMENTS

Some formalities are inevitable—such as regulations and service charges.

39 LOGICAL AND ESSENTIAL

Some merited praise.

40 APPENDIX

THE METROPOLITAN ENVIRONMENT

The government of the young Republic—while temporarily operating at Philadelphia in 1790—determined that a new and fitting city would be created as the Seat of Government of the United States. After extensive investigation, a site astride the Potomac River at about the head of tidewater, was selected. The city proper was to be called Washington—for obvious reasons—and would be set within a ten mile square area under general Federal control to be known as the Territory of Columbia. There were only

An earlier—and more placid—Pennsylvania Avenue.

The old has given way to the new, reflecting the growth in the intensity and complexity of metropolitan living.

two settlements of note in the vicinity, Georgetown and Alexandria, and these fell within the projected territory. The States of Maryland and Virginia ceded the lands necessary for this ambitious national capital and the nucleus of one of America's greatest metropolitan centers thus came into being.

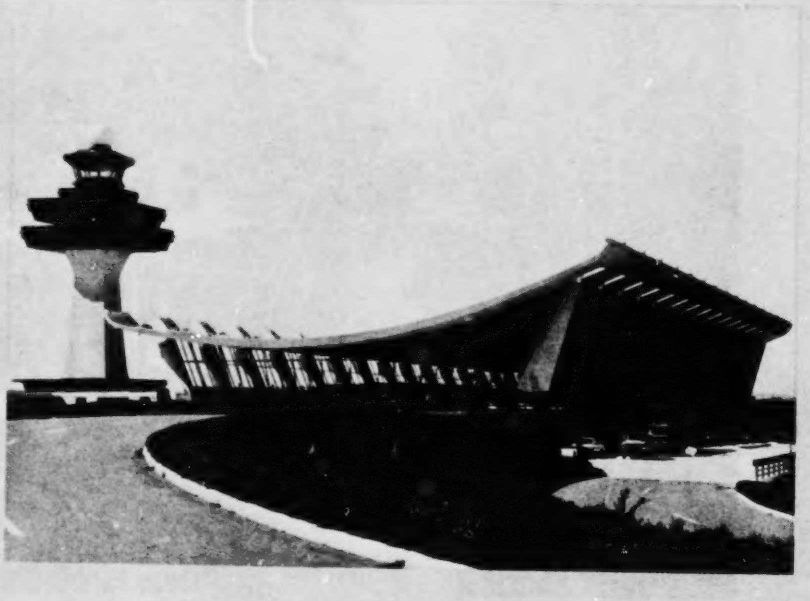
Neither the early shippers and traders who relied on the Potomac as their avenue of commerce, nor the planters and others whose livelihoods depended on the land, could have anticipated the profound changes in store for the general area of their activities. Until recently even their successors, as well as those in both local and national government, have had difficulty foreseeing and providing for the millions now residing in, and the many more millions yet to come to, the Washington Metropolitan Region.

The certainty of growth and the inevitability that such growth must involve lands more and more remote from the core city have focused much official concern on localities which even today are largely undeveloped. Corn fields will become subdivisions and pastures, industrial parks.

While there are many growth stimuli which are common in some degree to all such metropolitan conglomerates, there is here at work an additional force which is peculiar to the Washington environment. The Federal Government in the discharge of its many responsibilities has found the originally selected ten mile square territory—reduced to 68 square miles through retrocession of the Virginia portion in 1846—far too small to contain the numerous and extensive establishments necessary for its purposes. Many of these are beyond the early territorial limits which now bound the District of Columbia, known as Washington.

This is the story of how one such Federal development — the Dulles International Airport — galvanized the highest official and public opinion and precipitated what has been the most forward looking construction project on the Metropolitan scene—the Potomac Interceptor.

Dulles International Airport—
the striking Terminal Building.



THE RIVER

The availability of a river had been an essential consideration in the selection of the site for the Federal Capital. For this the Potomac was ideal. Not only was it beautiful and of appropriate scale to form a perfect setting for a monumental city; it also assured communication by water to most of the population centers of the world. Its course from the Alleghenies also marked one of the principal routes of land travel into the slowly developing interior. In addition to beauty and communication, it provided extensive fishery resources of economic importance.

The Potomac had much more to offer. However, recognition of this had to await the time when the city's development had outstripped its meager local water sources and an ample water supply had become a necessity. The river's 11,460 square mile drainage area above Washington which produced an average daily flow of over seven billion gallons provided the perfect solution. The quality was so good, and the flow so abundant that Lt. M. C. Meigs, the originator of the water supply system—in his report of 1853 to Congress foresaw that:

From an avenue of commerce the Chesapeake & Ohio Canal has become one of man's most cherished works. Its water's purity depends on that of the Potomac.

"The streets, in hot weather, may be flooded every morning by hose. Every particle of dust or offal prejudicial to health or comfort would thus be washed into the sewers. The most magnificent fountains could be kept constantly flowing; and the city of Washington, unrivalled in grandeur and beauty of plan, would, in a few years, refreshed by living streams, and beautified by sparkling jets and towering columns of water, become a place of summer resort and the admiration of our whole people."

Potomac water, diverted from the river just above Great Falls, first flowed to the city in 1863. In spite of the war-swollen population, no more than ninety thousand persons were on hand to enjoy its benefits.

From this small beginning, however, the pattern of future use and a profound influence on future metropolitan growth emerged. Over 70% of the water requirement of the 2,590,000 persons in the Metropolitan Region in 1966 was derived from the Potomac. By the year 2010, the river will be called on to supply 86% of the total metropolitan water needs of a population of 6,000,000, in a dry year.

Potomac water users reside in Washington, Rockville, Montgomery and Prince George's Counties in Maryland, and in Falls Church, Arlington and Fairfax Counties in Virginia. The extent of public and official concern as to the Potomac's continuing availability and suitability for its vital role in community and governmental life should, therefore, be of no surprise.

For the reaches above the city, from which the drinking water is drawn, the Interstate Commission on the Potomac River Basin first established water quality objectives of a high order to which the river generally conformed, having continued to be of good quality since its selection as a water source a century before. With the onset of some community development near the river and the prospect of treated wastes being generated there, a further quality criterion, first adopted in November, 1957, by the Washington Metropolitan Regional Conference, gained general acceptance by the majority of the local governmental authorities. This provided that from the confluence of the Monocacy River to below the water intakes, "Development should be so designed as to prevent discharge of effluent from sewage treatment plants either into the river or its tributaries."

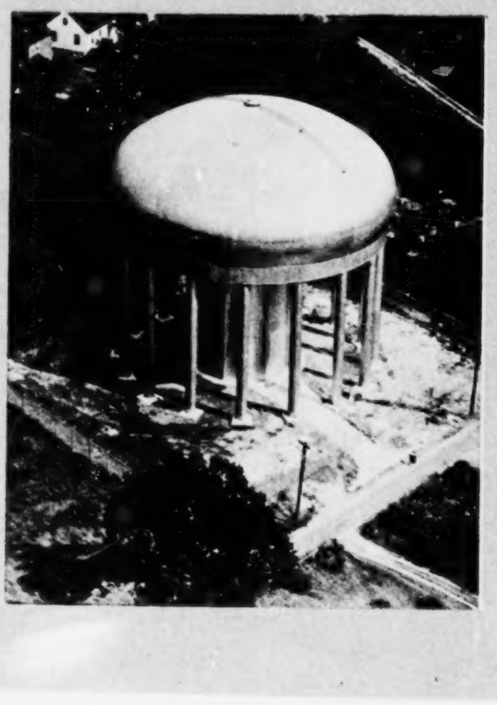
The Potomac highlights the monumental architecture of the capital city.

THE DILEMMA

The recognition in November, 1957, of the necessity to keep the Potomac of a quality suitable for water supply purposes was perhaps the first, generally unanimous, important position or policy to be adopted by the emerging organization of metropolitan leaders —later known as the Metropolitan Washington Council of Governments. Within less than one month this was to begin its most severe test.

The site selection study for what became the Dulles International Airport, published in December, 1957, showed the most suitable location to be at the head of the Broad Run watershed which is tributary to the Potomac near the Fairfax-Loudoun County boundary. Preliminary engineering considerations indicated no economically feasible alternative to "a treatment plant capable of accommodating the disposal needs of the airport."

Water service from the Potomac extends for many miles within and outside the District. This tank in Anacostia—the largest in the world when built in the 1940's—is about 20 miles from the intakes at Great Falls.



Federal authorities upon receiving this report quickly appreciated the importance of keeping the Potomac free not only from the airport's treated wastes but also from those produced by the great numbers of persons and businesses that would inevitably be attracted to reside or operate in the vicinity of the airport. Although the airport's authorization by Congress included provision for construction of a disposal plant at the site, there followed an intense investigation of alternatives which included diversion to the upper Occoquan, another water source, several local county-airport combination treatment schemes, direct connections to the Washington sewerage system over a variety of routes, and still other connections to proposed plant sites on the lower Occoquan. The consultants' report of December, 1958, in which all proposals were reviewed stated, "There is no question but that an "interceptor" is the more positive and permanent method of preventing pollution of the water supply for the metropolitan area."

A direct connection from the airport to the District of Columbia sewerage system of a size only sufficient to meet airport needs was shortly presented to Congress and failed approval. Whereupon President Dwight D. Eisenhower in September, 1959, requested airport authorities "not to proceed with work on the treatment plant until this issue has once more been fully examined."

The concern of community leaders, area planning agencies, local governing officials and federal authorities responsible for water supply and public health was by now well known to the President, the appropriate committees of the Congress and all others on whom a solution depended.

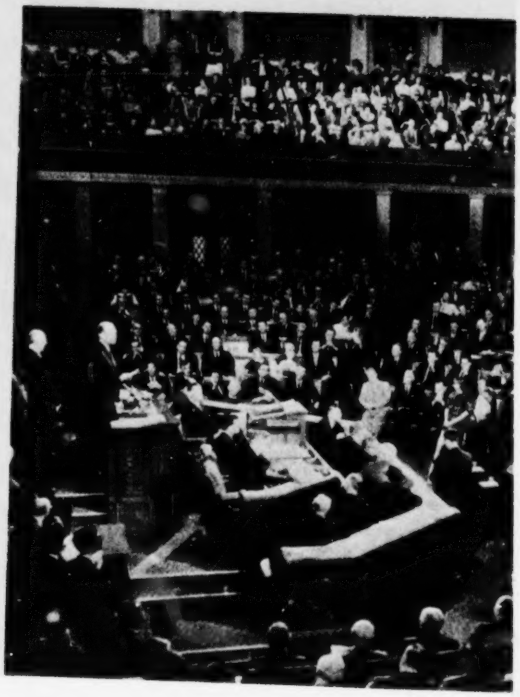
The construction of a permanent plant for the airport became less and less a threat. An "express" connection from the airport for its own use alone had been denied. All that remained appeared to be an "interceptor" sized to meet airport and metropolitan needs within the zone of its influence—and this must be in service before local users would be available in sufficient numbers to pay an appropriate share of the cost at the outset. Some action was essential—and no conventional approach was at hand.

The new diversion dam at Little Falls, just above tidewater, is the farthest point downstream from which drinking water is taken. This is one of two such dams used for the Washington system.

THE DECISION

In its letter of May 4, 1960 to the Congress the Bureau of the Budget stated in part, "The President shared in the Administrator's (Administrator of the Federal Aviation Agency) conviction that the Federal Government has a degree of responsibility along with local jurisdictions in assuring a comprehensive solution of the National Capital water problem. He considered it essential, moreover, that the solution of the airport problem coincide with, rather than impinge upon, orderly community development. Similarly, it is his belief that as local communities continue to expand, they will wish to provide for disposal facilities in a manner which will assure achievement of the longer range objectives sought for the Potomac River." The proposed legislation which accompanied that letter provided for:

All legislation affecting the District of Columbia is enacted by the Congress.



1

Construction of the Potomac Interceptor for disposal of sewage from the Dulles International Airport through the D. C. sewerage system and Water Pollution Control Plant at Blue Plains;

2

Collection and treatment of sewage from those areas of Maryland and Virginia tributary to the region through which the interceptor would pass;

3

A federal grant of $3 million for planning, rights-of-way acquisition and construction of the interceptor, in part;

4

Treasury loans of $25 million amortized as to principal and interest over 40 years with certain special repayment provisions, for the remainder of the construction costs;

5

Designation of the D. C. Commissioners to plan, construct, operate and maintain the sewer in cooperation with the other jurisdictions; and

6

The creation of a Metropolitan Area Sanitary Sewage Works Fund of the District of Columbia as a separate and special account through which all receipts from appropriations and revenues from operation and all costs of design, construction, maintenance, operation and amortization would pass.

These proposals transcended in scope and vision any of the schemes which had been previously advanced in the published reports of those charged with

Construction of the Potomac Interceptor was authorized by the Congress in June, 1960.

The District Building—seat of the city government which was directed to build and operate the Potomac Interceptor.

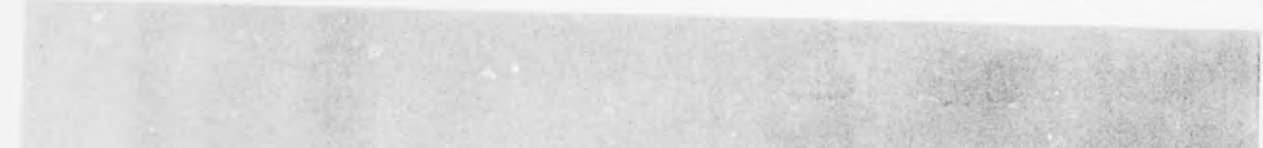
finding a solution. The proposed legislation fully faced the necessity to protect the Potomac not only from airport wastes but from those originating in the region of the airport. They recognized that not only Virginia but Maryland in the up-river area would also be influenced by growth pressures induced by the airport. They anticipated that the interceptor would become an integral "part of a regional sanitary sewer system", and so stated. They avoided the creation of a special federal construction and operating agency as had been considered, and instead made use of the extensive construction and operating experience of the largest local agency in the disposal field—the District of Columbia. They would create a financially -independent and self-liquidating project the direct federal cost of which, $3 million, would be no greater than that necessary to build a special pipeline for transport of airport wastes to the District's system.

The District of Columbia would be authorized to establish, by agreements with agencies of the United States and with the authorities of the States and local jurisdictions, charges for the use of the Interceptor which would be based on the costs of operation and maintenance, and amortization of the costs related to its construction. Recognizing that in the early years the users would be too few to generate loan repayments in adequate amounts, it would also be provided: "That interest and principal payments shall be deferred whenever the Secretary of the Treasury finds that the income received from charges for sewerage service is inadequate to cover these and other expenses properly chargeable to these receipts, and such deferred interest and principal shall be added to the sums payable to the Secretary of the Treasury in later years."

Users of the Potomac Interceptor including the United States, would also be charged by the District in amounts sufficient to cover its costs for carrying, treating and disposing of sewage in the sewerage system of the District of Columbia and for providing the facilities necessary therefor.

These proposals were enacted by the Congress without delay, and became law on June 12, 1960, as P.L. 86–515.

During 1967 the Congress reexamined the repayment provisions of P.L. 86–515 in the light of subsequent legislation under which federal grants of up to 55% of construction costs have been made available to States and local jurisdictions for sewer



Pipe of concrete was specially manufactured to exacting specifications.

construction projects, to prevent water pollution. Recognizing that the Potomac Interceptor had received a federal grant of only 11%, which in reality was the proportion of the project devoted to airport service, the Congress through enactment of P. L. 90–84 reduced the repayable amount of the federal loan for the interceptor by half, or $12½ million, bringing the grant to 55% of the estimated total construction cost.

PLANNING

The District of Columbia designated its Department of Sanitary Engineering as the municipal agency responsible for planning, constructing and operating the interceptor and for making the arrangements with other agencies and jurisdictions for its use and the payment of the necessary charges.

The project was to be available for airport service before the end of 1963—a barely possible feat in view of the planning and construction difficulties which lay ahead.

The planning must be worthy of the vision of the future which was implicit in the project's authori-

The interceptor bridges Little Falls Branch. The exposed side is harmonious with other stone work used by Park authorities in the Canal area.

zation. Not only must it recognize the physical considerations inherent in any engineering work, but also must it be responsive to the expectations of local officials and planners for their respective territories which would be affected by it, and both to be achieved at a cost within the funds available.

During the two and one half years which had elapsed between the selection of the airport site and the decision to build the Potomac Interceptor there was a mounting recognition of the need for a general pattern as a guide for waste water disposal throughout the Metropolitan region. Accordingly, the Regional Sanitary Board (1), comprised of the engineers or other representatives of the city, town and county authorities having responsibilities in this field, secured the financial support from their respective governing bodies for a report to be developed by Doctors Abel Wolman and John C. Geyer on "Sanitary Sewers and Waste Water Disposal in the Washington Metropolitan Region." This would be the first comprehensive, area wide examination of present and possible future trunk and interceptor networks, treatment facilities and effluent disposal points. This study, started on February 16, 1960, was in progress when the interceptor planning began.

To maintain the momentum of earlier work and take advantage of the familiarity with the airport disposal problem already gained by the engineers, Burns & McDonnell of Kansas City, Missouri, who had studied it for the airport authorities, the District immediately retained the same private consultants to develop a basic plan. To insure absolute coordination on a regional basis the District stipulated "The Consultants shall lay out and conduct their operations in such sequence, manner and detail as will most effectively facilitate and expedite those elements of the Wolman-Geyer study project which have a bearing on the proposed sanitary interceptor and trunk sewer line up-river from the District of Columbia." The desired result was attained and the Potomac interceptor as finally developed was incorporated as a part of the system for metropolitan disposal recommended in the Wolman-Geyer report of June, 1962.

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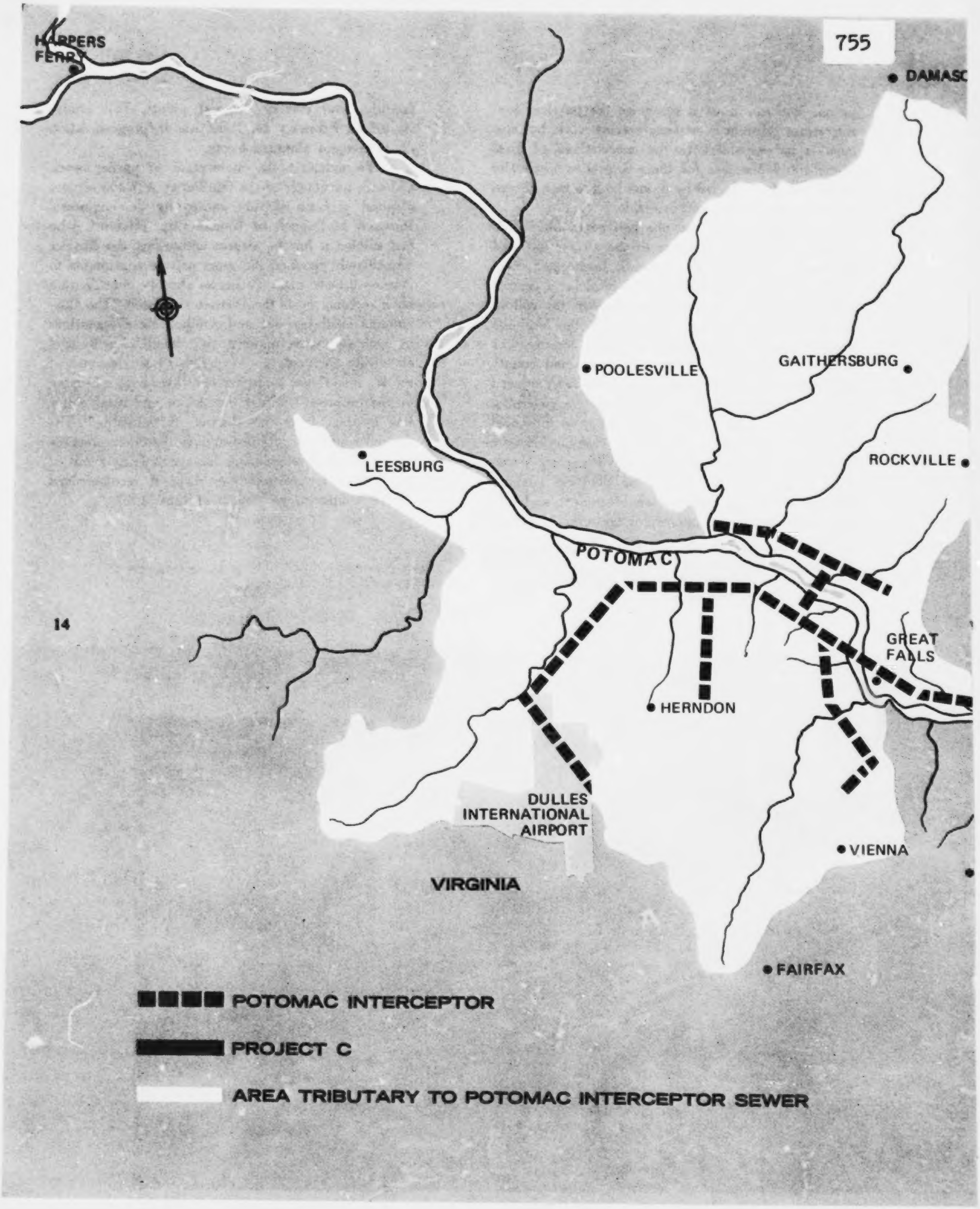
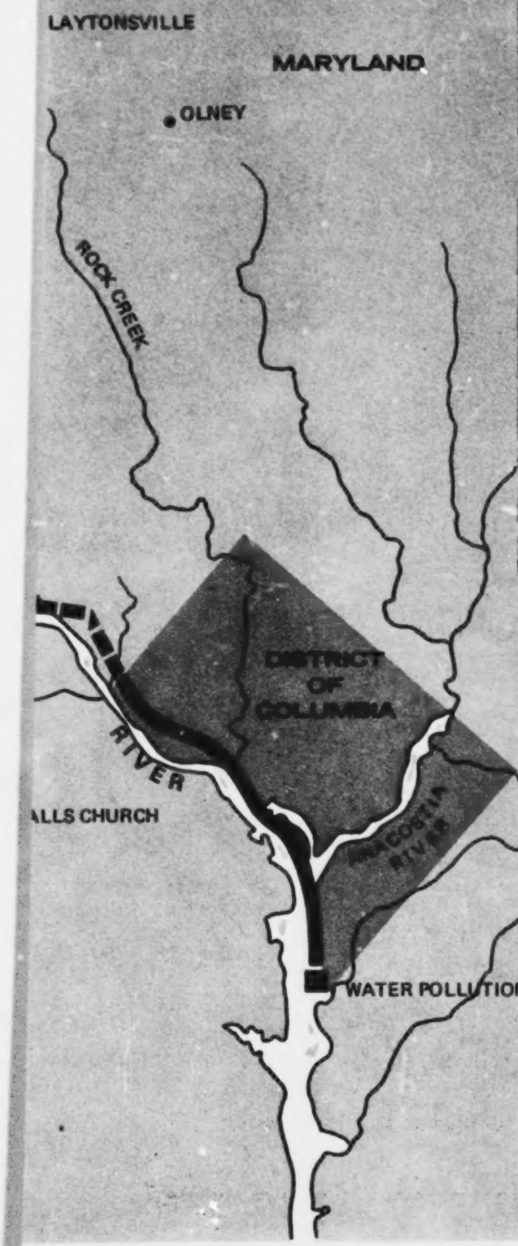
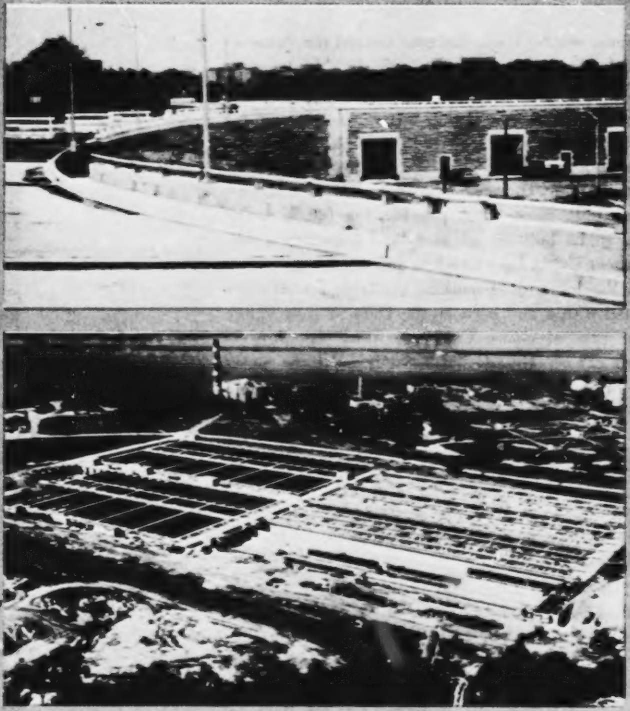
(1) Note: The Regional Sanitary Board of the Washington Metropolitan Conference, presently known as the Regional Sanitary Advisory Board of the Metropolitan Washington Council of Governments.

The Potomac Interceptor General Plan of R



The Potomac Interceptor General Plan of R





Top—Midway in their trip through Project 'C' conduits in the District, Potomac Interceptor flows are pumped at this station secreted under an approach to the Theodore Roosevelt Bridge.

Bottom—All Potomac Interceptor flows are treated at the District's Water Pollution Control Plant.

oute and Tributary Areas

Tributary Areas

Since some nearby areas draining toward the Potomac up-stream from the District both in Montgomery County, Maryland and Fairfax County, Virginia were already, or would shortly be, served by local sewers which flowed to the District or elsewhere for disposal, no provision need be made in the new project for their accommodation. To serve its purpose it was concluded that the interceptor must provide for future sewer systems to be built in all Maryland tributary watersheds above Cabin John Creek to and including Seneca. On the Virginia side it must be available for all flows generated within and between the Difficult Run Valley and the arm of Goose Creek on which Leesburg is situated. These boundaries approximated the outer limits beyond which dense development requiring central waste collection and disposal appeared too remote to justify any early construction. Also it would appear that the availability of the interceptor to the upper regions selected would render the "no effluent policy downstream from the Monocacy," previously adopted by regional and local bodies, perfectly feasible for fulfillment.

The total area tributary to the interceptor would be 376 square miles; 176 in Maryland and 200 in Virginia. The eventual accommodation by the interceptor of this region met with the approval of the Regional Sanitary Board and its consultants, Doctors Wolman and Geyer, the National Capital Regional Planning Council and the National Capital Planning Commission. This would be the largest territory served by any single element of any of the waste disposal systems in the metropolitan region outside the District of Columbia.

A portion of the area being served by the Potomac Interceptor

Populations Served

After determination of the tributary areas, forecasts of the expected populations to live in those areas and the proportions of those who would have collecting sewers available to them became necessary. The staff of the National Capital Regional Planning Council, with the cooperation of local planning agencies, helped to develop the necessary population estimates. Since the design period assumed for the project had been fixed at 40 years, the number of persons or their equivalent, when considering possible commercial and industrial activities, to be in the area in the year 2000 would make flow estimates possible.

A total equivalent population of 511,850 in the year 2000, 172,500 in Maryland and 339,350 in Virginia, became the basis of design.

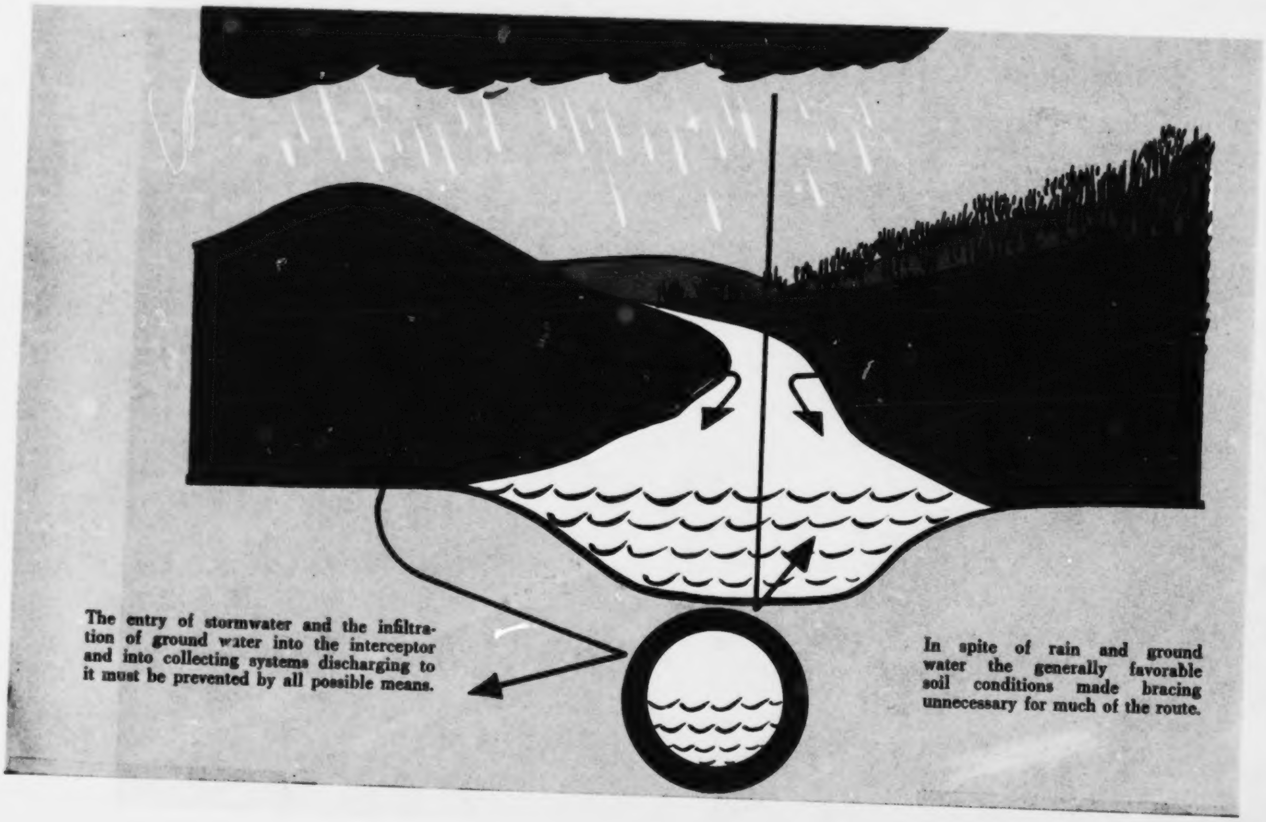
Not only was it necessary to know the total population to be served, but some idea as to the locations at which their influence on the interceptor would be felt was also important. For this determination the planning engineers were required to try to foresee the future local piping systems ultimately to be built within the sub-watersheds and lay out their sizes and locations based on the anticipated arrangement of the future residents, taking due account of zoning and topographic influences on probable development density.

Flows To Be Carried

It was assumed that only domestic, commercial and industrial wastes plus some small unavoidable quantities of stormwater and groundwater infiltration would reach the interceptor through the local connecting piping systems. A basic per capita average daily flow of 100 gallons was selected, and an additional allowance of 25 gallons per capita per day was made for stormwater plus infiltration. Industrial and commercial production was predicated on the assumed levels of employment or public accommodations provided.

The gauging of actual flows already entering the District of Columbia from large areas in Maryland was used as the basis for estimating the flow variations to be expected within an average day—as between day and night—and also as indicative of the effects to be expected from the widely separated sub-areas which would be connected to the system.

As a result of these studies it was concluded that the peak contributions would approximate 2½ times the daily average and that, with infiltration and other allowances, the interceptor should be sized to convey up to 300 gallons per capita day. The total peak flow rate thus to be carried was fixed at 150.62 million gallons per day.



The entry of stormwater and the infiltration of ground water into the interceptor and into collecting systems discharging to it must be prevented by all possible means.

In spite of rain and ground water the generally favorable soil conditions made bracing unnecessary for much of the route.

Interceptor Alignment

The guidelines selected for establishing the interceptor alignment were:

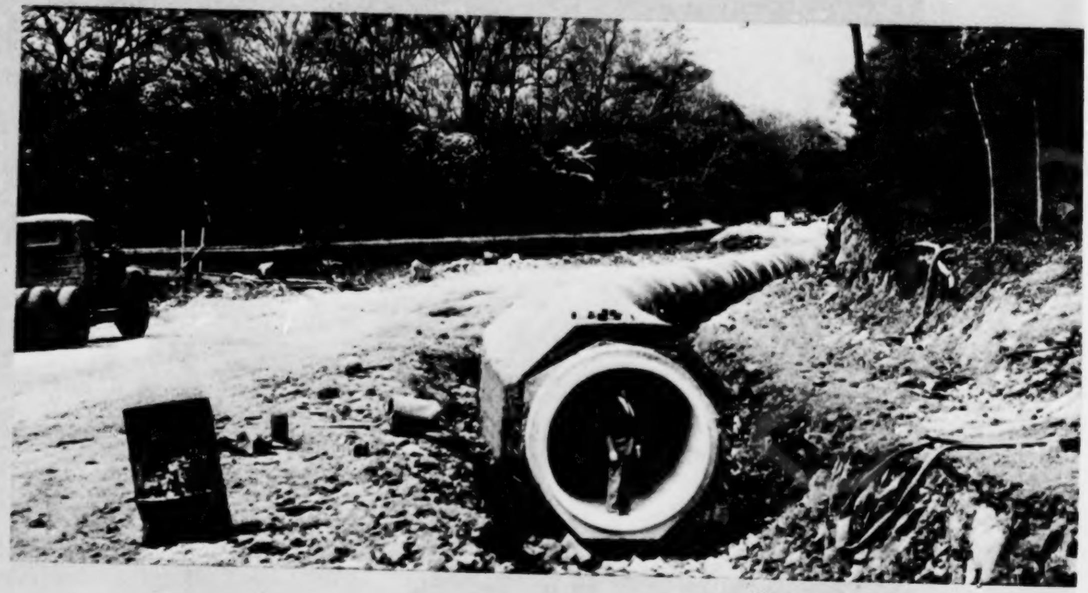
1. To best protect the river from pollution.
2. To achieve an installation which would be most economical in both the initial and annual cost.
3. To minimize damage to esthetic and historical features of the valley.
4. To have all-gravity flow without inverted siphons.
5. To be economically accessible to all local areas to be served.
6. To be compatible with all probable future developments, both locally and area-wide, in the watersheds tributary to the Potomac.

Apart from sound construction of adequate size, the accessibility of the interceptor to future users would be the key to its effectiveness in preventing pollution. If it were beyond economical reach it would not be used. The alignment finally selected insured convenient access from within each of the tributary watersheds for which service was intended.

The avoidance of pumping which would be both costly and subject to interruption with attendant pollution risks, was an attainable goal, thanks to the difference in elevation between the up-river watersheds and the District of Columbia. The entire interceptor system would operate on gravity flow which would be of advantage also to local users who might otherwise have to resort to pumping in order to connect. Moreover, through careful site selection and the use of tunnels there would be no inverted siphons which present maintenance difficulties no matter how well designed. Considering the extent of the system, over 42 miles, and its remoteness, it was essential to keep it simple and trouble free.

At either of two locations above Great Falls, River Bend or Block House Point (later known as the site at 'Seneca'), a dam for water supply and flood control, and possibly other purposes, has been proposed from time to time, and has been widely debated. The effects on the interceptor of any decision to build a dam at either place had to be anticipated. Moreover, since the interceptor would be near the river at each site it would be essential that its presence not preempt dam construction. If the location and elevation of a dam were fixed and construction assured, the interceptor system would best be constructed outside and along the shoreline of the resulting impoundment, and at generally higher elevations than if no dam were to be built. An interceptor so located would be longer, more costly to build and less accessible to local using agencies than one which would be closer to the natural course of the river and its tributary streams. It was therefore, decided to make no change in elevation or alignment to accommodate possible future impoundments. This decision carried with it the certainty that if a dam were built the sewer would be under many feet of water at the bottom of the resulting lake. To meet these conditions would simply require a conduit which would not float when empty or partly full, which could withstand the outside water pressure and which had tight joints. Access would be arranged through construction of islands in the lake with suitable shafts extending from above the surface to the submerged pipe below. Moreover, the danger of contamination of any future lake by accidental loss of the pipe's contents was considered so remote that the concurrence of health authorities with the mode of construction proposed was readily secured. The most desirable routes

The interceptor was here laid in the bed of the Chesapeake & Ohio Canal which was drained for the purpose.



in the vicinities of the dam sites placed the interceptor in tunnels sufficiently distant so that no structural interference could occur between a dam at either place and the sewer.

A future Potomac dam will not adversely affect the Potomac interceptor or vice versa.

Along the nearby Potomac Valley upstream from the District of Columbia there are few evidences of engineering works apart from the C. & O. Canal, the water intake diversion dams and related structures, and the recent crossing of the Capital Beltway. It was essential that the interceptor not alter this bucolic state. It should be lost from sight, (although a suspension bridge to carry the Difficult Run connection across the Potomac Gorge just below Great Falls received serious consideration as the only way to avoid construction through Great Falls Park), and its installation should be accomplished with the minimum of even temporary landscape blemish.

A route along the Maryland side between the District and Great Falls promised to meet these conditions if much of the line could be laid under the canal. Thus no permanent scars on the steep hillsides and little or no loss of trees of significant size would occur. The upper Maryland collector between Watts Branch and Seneca Creek would also be perfectly suited to this same mode of construction.

The main line would cross the Potomac to the Virginia side just above Great Falls in a vast trench cut into the ledge rock of the river bottom.

The approaches to this crossing would be tunnels totaling over four miles in length. Proceeding farther up the river valley the line would lie in the flood plain wherever feasible with conditions favorable to open trench construction, but two additional tunnels would also be necessary before the Broad Run Valley could be reached: Extensions up this and the valleys of Difficult and Sugarland Runs would be necessary for

Over nine miles of tunnel were required—to save length and to afford the best gradient.

service to the airport and other future users in Virginia. A branch to serve Maryland would cross the river some three and one half miles above the main crossing. Permanent roads to ensure accessibility to the project would also be necessary, but for the most part it would be possible to use or acquire routes already largely cleared.

Overall, it would be entirely feasible to build the interceptor with no significant, lasting ill effects on the river valley or other lands to be traversed.

Consideration of: (a) the maintenance of ample flow velocities during the early years; (b) induced flows from the river or streams on occasion for dilution, cleaning or velocity control; (c) flotation of the interceptor during floods; (d) possible leakage of ground water or water from the canal or river into the structure; (e) sulfide generation with resultant attack on the pipeline materials; and (f) the possible need for treatment of flows for stabilization during the 24 hour travel to the treatment plant, indicated that suitable solutions could be found.

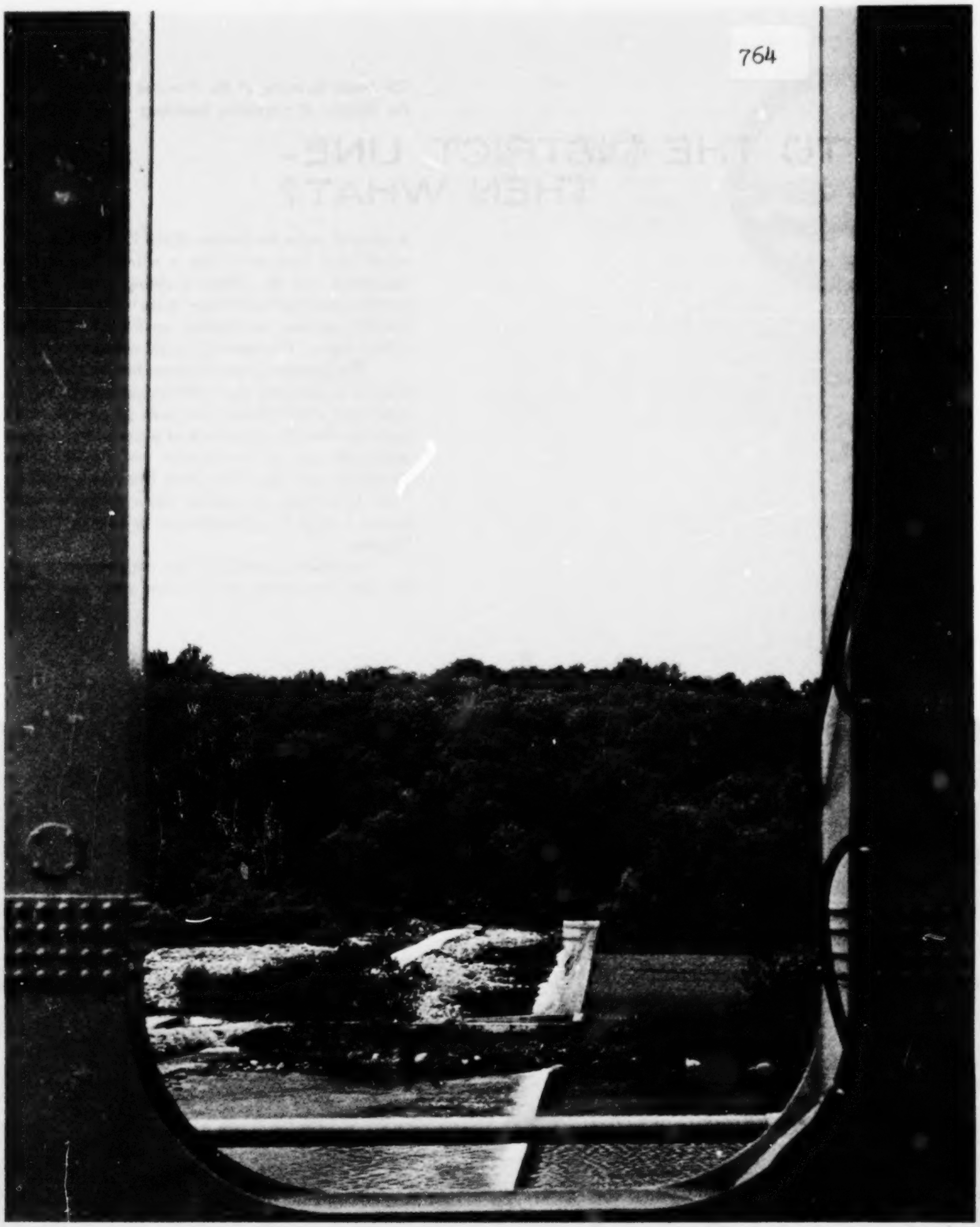
The planning estimates showed a possible cost of some six million dollars in excess of the authorization. However, with favorable tunnel prices such an overrun could be avoided.

There was concern among planning authorities that the availablity of the interceptor to undeveloped lands could stimulate pressures for unwanted subdivisions and other development. Every assurance was given by the District, however, that local governments would retain complete control over all connections to the interceptor system and would continue to enforce their local policies concerning land use and development as before. The valleys of the river and its tributary streams would thus retain their intended open space character under the protection of local controls.

While a dozen possible routings were studied, one best met the requirements as to service to be provided, and construction and operating costs and problems. This best plan received the endorsement of local and regional planning authorities, state pollution control agencies, the Metropolitan Regional Council of Governments and, where necessary, the governing officials of the localities through which the interceptor would pass.

DISTRICT OF COLUMBIA
POTOMAC INTERCEPTOR SEWER
DULLES AIRPORT TO D.C. LINE
NICHOLS SEGMENT & RIVER CROSSING
DEPARTMENT OF SANITARY ENGINEERING
BOARD OF COMMISSIONERS, D.C.

The route was away from city congestion. The protection of settings like this was one of the challenges to the designers.



For much of the distance the Potomac approaches the city through woods and unspoiled countryside.

TO THE DISTRICT LINE-
THEN WHAT?

The lower terminus of the Potomac Interceptor is at the District of Columbia boundary. Here the sewer is situated under the bottom of the C. & O. Canal. It would have been more than a miracle had it been discovered that the District's piping system at this location just happened to have spare capacity for some 511,850 persons contributing up to 151.17 million gallons daily. Of course, this it did not have.

The District's Upper Potomac Interceptor (something of a misnomer under the circumstances) had its upper end at the District Line with its capacity fully committed for the conveyance of potential flows originating not only in the District, but also from the Little Falls and Cabin John Creek Watersheds in Maryland. In addition, on passing Chain Bridge it would receive a large flow increment from Fairfax County, Virginia.

Fortunately, studies of the city's sewerage system had been under way for some years and a pro-

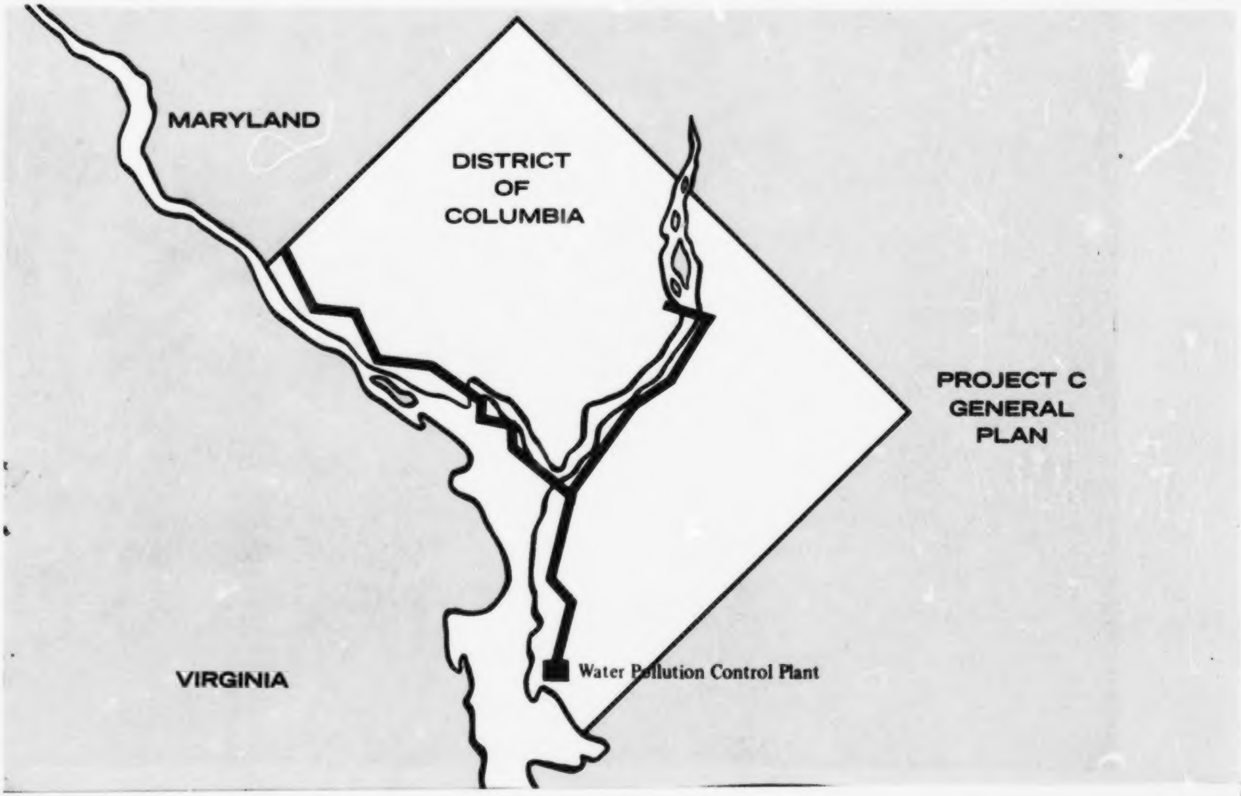
The taking of flows from the Potomac Interceptor is only one of Project 'C's many purposes. Here one of its underground pumping stations will reduce contamination of the Anacostia.

gram of major improvements, centered around what was known as Project 'C' was then in progress. Included as part of this project would be a sanitary relief trunk or interceptor sewer extending from the Water Pollution Control Plant at Blue Plains generally along the Potomac River for some eleven miles to the District Line in the vicinity of the C. & O. Canal. Although design of some elements of this was then in progress, it was not too late to include provision for the Potomac Interceptor so capacity would be insured all the way to the treatment plant. During construction of the Potomac Interceptor, the portion of Project 'C' to which it was to discharge was built simultaneously for some distance downstream.

Since Project 'C' was not completed for its full length when the Potomac Interceptor was placed in service, the meager initial flows from the latter were temporarily accommodated in the older portions of the system. The final use of Project 'C', however, insures that wastes originating in the Potomac Interceptor will never be mingled with combined or storm flows from elsewhere and thus will be certain to receive full treatment before discharge to the Potomac.

By simply increasing the capacity of Project 'C' instead of building a special conduit for Potomac Interceptor flows to the treatment plant, it was possible to effect great savings in cost. Also, the timeliness of the decision to build the interceptor averted the successive excavation of two vast trenches the full length of the city.

In view of the substantial increase in the cost of Project 'C' to carry the higher flows, the Congress extended to the District the privilege of borrowing funds to the extent of $10 million to cover this increase on the same repayment terms as applied to the Potomac Interceptor itself. Moneys for the retirement of this debt would come from users of the interceptor in Maryland and Virginia, who would not be numerous during the early years of the project's availability.

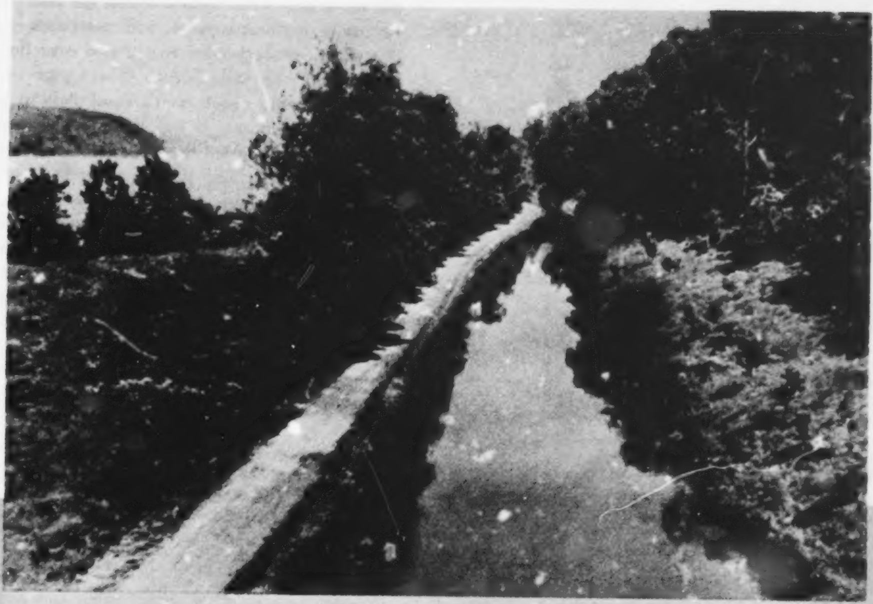


DESIGN AND CONSTRUCTION

Once the general plan had been developed, and after careful consideration of a number of alternate methods of undertaking design and engineering on construction, the District retained jointly the two firms of Black & Veatch and Burns & McDonnell for the work.

To fix the exact locations of the interceptor required careful surveys and accurate controls throughout. The distances were great, the rate of fall would be very slight, the tunnels would be long and frequent and the terrain near the river for the most part was steep and rugged. While the complete route was surveyed by conventional methods, a line was so marked that aerial surveys could then rapidly supply information as to the topography.

The interceptor would have a circular shape throughout all the parts constructed in open trench because precast concrete pipe was specified. The joints would be accurately made and sealed with rubber gaskets to insure no leakage either into or out of the line. Where exterior water pressures could become



The same setting after construction. The canal was restored to its original unsilted shape and generally improved as part of the construction work.

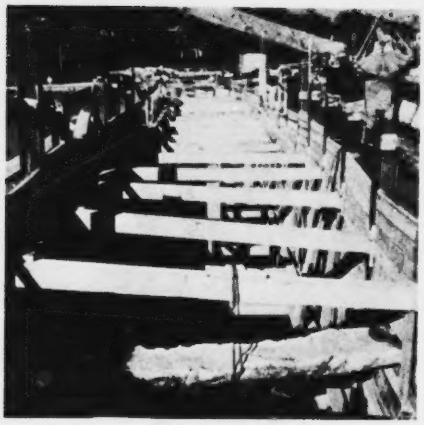
Construction in progress in the C. & O. Canal. This route made possible the preservation of trees and other vegetation for many miles.

great, as under a future reservoir, the rubber gaskets would be confined by steel joint surfaces. The cement in the concrete was to be resistant to sulfide attack and extra concrete thickness over the steel was expected to provide at least one hundred years of added resistance to such attack.

Either rock or other sound foundation material was encountered throughout almost the entire project. To insure uniform support, with minimum comparative effort, crushed stone was placed over the trench bottom for pipe embedment. Where pipe would be submerged in the canal, river's flood plain or possible future impoundment, it was built of sufficient extra weight so as to prevent flotation, or was covered with concrete ballast having the same effect.

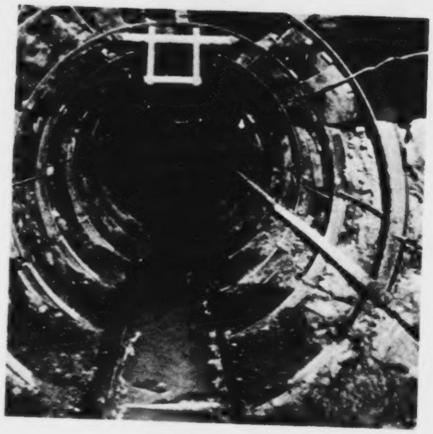
The extra care given to the jointing, strength and mass of the structure would render it suitable for use with moderate pumping heads should future loading require an increase in carrying capacity.

The tunnels were almost entirely in hard rock with generally little requirement for roof support. All tunnels were lined with concrete, either through use of manufactured pipe and packed with cement grout, or by linings cast in place within the tunnels.



Heavy bracing of trenches was unusual but sometimes necessary.

Miniature trains expedited transport of "muck" — excavated rock—in the longer tunnels.



Tunnel roof supports were installed according to need. The finished conduit here would have a circular shape.

Carefully selected and placed foundation materials support the pipes, each of which is laid to exact alignment and grade.

Tunnel roof supports where the finished conduit will have a "D" shape.

The finished "D" shaped tunnel. The small pipe, lights and wiring necessary during construction will be removed.

The main line when completed was so watertight that total infiltration of groundwater, canal water and river water accumulated at the lower end was negligible, less than 0.2% of capacity.

The largest parts of the interceptor have an internal diameter of 7′-0″. At its entry to the airport the main line is 3′-6″ in diameter. A summary of lengths and sizes of the total work is given elsewhere herein.

In view of the many hazards, special care was given to safety throughout the work. In spite of all precautions, two lives were lost. One was that of a young engineer who was washed away in spite of life lines, while surveying in the river bottom above Great Falls. The other was from the premature explosion of a loaded tunnel face believed to have been detonated by a stray charge of lightning some hours after the passage of a storm. Despite these two fatalities, considering the many hazards on the project, tunneling over nine miles, two river crossings and excavations up to 40′-deep the project safety record was excellent.

The necessity to secure the concurrence of the officials and agencies of most of the metropolitan community caused the planning to proceed at a speed which precluded the completion of surveys before

Special fittings were designed and built to facilitate the entry of large connections to the main line—this is called a "Y".

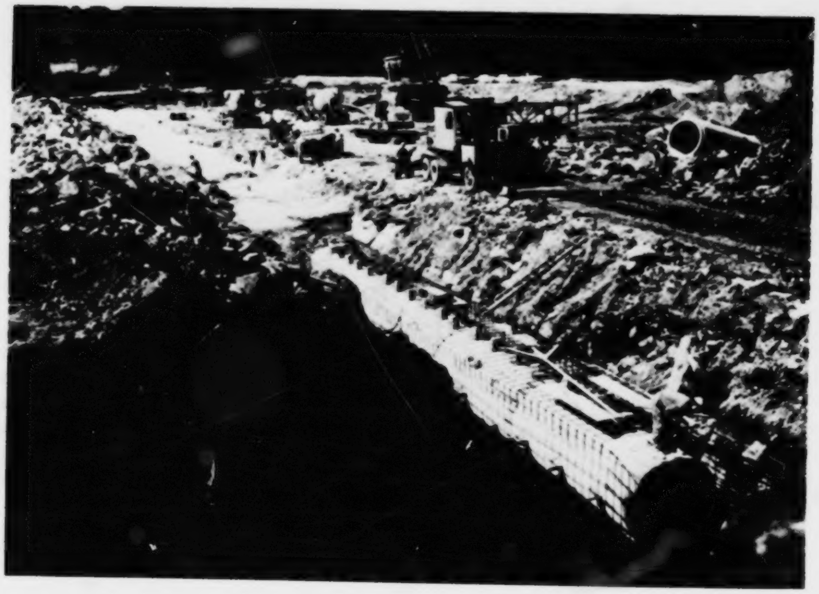
severe winter conditions made them impossible. Persistent snow cover obliterated topographic features on which design depended. Even so, it was possible to take bids on the first construction contract in June, 1961, thirteen months after Congress authorized the work.

The promised completion of the main line for airport service before the end of 1963 made it necessary that work be carried on simultaneously at a number of locations, under separate contracts. Tunnels being the slowest, the contracts for their construction received first attention. The performance time set for the contracts also made it usually necessary for each contractor to conduct work at two or more locations at once.

A complete and continuous structure extending from the District to the airport was made available for service in December, 1963, the target date.

The lateral extensions in Virginia and Maryland, except the upper river crossing for the Maryland collector outlet which was built along with the main line, have been placed under contract as rapidly as convenient, all being available when needed by local users.

The final cost of the work will be slightly less than the authorization. This is an unusual achievement for a project of such scope and duration.



To prevent flotation and otherwise protect pipe under the river, a concrete envelope with a cage of reinforcing steel was installed.

Cutting the trench in the ledge rock of the river bottom above Great Falls.

USER ARRANGEMENTS

Agreements

Public Law 86-515, which authorized construction of the Potomac Interceptor, states in part:

> "The Commissioners are authorized to establish, by agreements with the appropriate agencies of the United States and with the proper authorities of the States and local jurisdictions concerned, charges for the use of the Potomac interceptor, . . ."

Over a hundred years of siltation has changed the once trapezoidal shape of the C & O. Canal—it was watered during the final days of Interceptor construction.

Formal agreements have been executed between the District and the following jurisdictions and agencies:

Fairfax County Park Authority	January 23, 1964
Federal Aviation Agency	February 11, 1964
National Park Service	August 18, 1964
Loudoun County Sanitation Authority	October 24, 1964
Fairfax County	February 11, 1965
Town of Vienna	February 26, 1965
U. S. Navy (David Taylor Model Basin)	April 27, 1965
Washington Suburban Sanitary Commission	July 6, 1967

Most significant is the fact that residents and businesses deal only with the sanitary authorities of their respective jurisdictions. These latter make arrangements for use of the interceptor and any connections of local public sewers thereto. Provision is made in the agreements for the connection of facilities which may be jointly financed or operated by two or more jurisdictions.

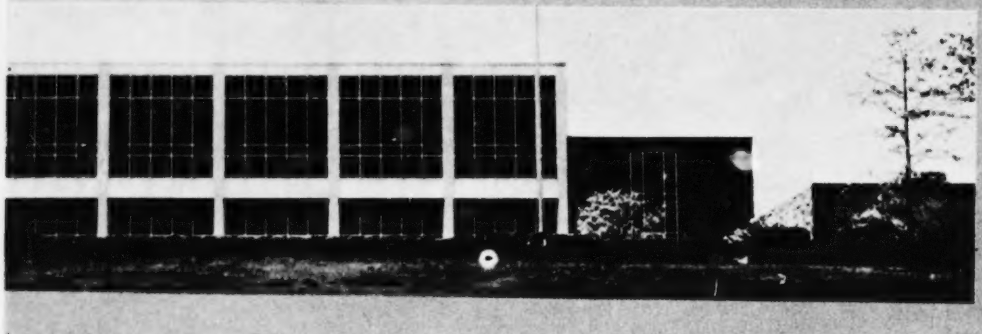
Meters are required at all major points of delivery to the interceptor so the quantities from each using agency may be recorded. The costs of furnishing, installing and maintaining the meters are borne by each such user.

Each agency agrees to pay a single charge or service rate which when multiplied by the volume of sewage delivered to the interceptor by it will constitute the total cost to that agency for the sewage service for the periods during which the flows are recorded. This service rate is the same for all agencies using the interceptor system.

The service rate applicable at any time is calculated to include:

1 The actual costs to the District for handling, pumping and treating all sewage discharged from the using agency's sewerage systems into the Potomac Interceptor system and thence into the sewerage systems of the District of Coumbia.

Many roads were built to provide access to the remote interceptor route.



Water Filtration Plant of the Washington Suburban Sanitary Commission— the second largest user of Potomac Water. This installation will be one of the larger 'customers' of the adjacent Potomac Interceptor.

2 The proportionate costs of operation, maintenance and amortization of the costs of all planning and construction, (including acquisition of rights-of-way) of the Potomac Interceptor system, excluding any Federal Grants made for these purposes;

3 In proportion to its usage of the Potomac Interceptor system, the construction and amortization costs incurred by the District, excluding any Federal Grants applicable thereto, for the provision of facilities for handling, pumping and treating sewage discharged or to be discharged by the using agency through connections to the Potomac Interceptor system.

The agreements, of course, contain much language designed to facilitate their administration by the parties. The most important remaining 'policy' provision in the agreements is as follows:

> "Section 2 (A) The using agency shall prevent the passage from its sewers into the Interceptor of any drainage other than sanitary sewage or wastes not detrimental to the Interceptor or to the District's sewerage systems or treatment processes, and shall use every precaution in construction, and in regulations governing the use, of its sewers and sewerage systems to exclude therefrom surface water, rain water or ground water and in all other respects shall conform with and enforce within those portions of the agency's sewerage systems tributary to the Interceptor, where applicable, such regulations of the Commissioners governing the use of said Interceptor as may be prescribed pursuant to the authority vested in said Commissioners under PL 86-515."

Regulations

Regulations covering the use of the interceptor and designed to carry out the intent of the section just quoted were issued in November, 1964 by the District. Detailed requirements as to the materials, workmanship and methods of laying and jointing sewers and house connections tributary to the interceptor are set forth. To insure observance, it was also stated that:

> "The designs, plans, specifications and construction of new tributary systems and additions to existing systems, if any, which become tributary, may be subject to review, inspection and concurrence of the District."

The regulations have the further requirement that:

> "Prior to making connection of its system with the Interceptor System, the jurisdiction shall enact, and thereafter shall maintain and strictly enforce regulations governing plumbing work on private property within the areas to be served through the Interceptor, said plumbing regulations to be in consonance with the intent of these regulations."

Detailed limits and restrictions on the character of sewage and wastes which may be discharged to the interceptor are also provided.

Every effort has been made to insure that the interceptor will be held safe from injury and will not be overloaded and thus rendered unable to fulfill its mission of protecting the Potomac River.

Charges

It was recognized that the sanitary authorities would undertake heavy expenses for the initial construction of the local sewerage systems necessary to hook up to the interceptor. They would thus be under the most severe financial pressures during the early years when there would also be the fewest people available to share in the costs. Accordingly, in shaping the rates it appeared essential that advantage be taken of the privilege of deferring interest and principal repayments in the early years. Also, during this period with low flows the maintenance and operating costs would be relatively much greater. The rate initially fixed has been $138.00 per million gallons. Under the first calculations the progressive addition of amortization charges would have produced a maximum charge of $267.00 per million gallons in the year 2000, exclusive of any costs of improvements to the Water Pollution Control Plant.

The passage of P. L. 90-84 in 1967 which reduced the repayable federal loan from $25 million to $12½ million could reduce this maximum charge by some $96.00. The exact rate effects have not been fixed as of this time. Reductions of this order should insure that the costs would not prompt some political jurisdictions to use treatment plants up-river notwithstanding the general effort throughout the metropolitan region to discourage them.

Revenues

The use of the interceptor and the revenues derived therefrom were less than expected for the first three years of service. This was the result of an unexpected deceleration in the home building industry. Loudoun

The interceptor's route across the Potomac above Great Falls was just downstream from the diversion dam from which most of Washington's water supply comes. Dam is in background.

County, the most remote user, has the distinction of having made the first payment to the Metropolitan Area Sanitary Sewage Works Fund in the amount of $20.08 for service in fiscal year 1965. Total receipts of the fund from seven using agencies were $24,049.28 in 1966, $56,369.38 in 1967; and $65,000.00 is estimated for 1968.

Some 30,000 persons, or their equivalent, are estimated to have been served by the interceptor system in 1968 instead of the 97,000 previously forecast for that year.

The continuing construction of branch lines and local systems tributary to the interceptor is expected to result in greatly increased use in the early future.

Operations

The high quality of construction and the skill used in the planning and design will be reflected in exceptionally low expenditures for operation and maintenance. The right-of-way, access roadways and protective enclosures require more attention than the interceptor itself.

The entire 42 mile route of the project is routinely patrolled by a special crew which checks the condition of the right-of-way, inspects appurtenant structures, conducts meter tests and observes the quality and characteristics of the sewage. These procedures will assure the proper functioning of the system.

This clearing, made by others, proved of convenience during interceptor construction.

"LOGICAL AND ESSENTIAL"

Every aspect of the Potomac Interceptor is remarkable. First of all, it is an engineering work of ample and bold concept, executed with precision as to time requirements and fund limitations without the sacrifice of landscape and natural values in a critically sensitive setting. It will fulfill its purpose for many years to come.

More remarkable, however, was the unanimity of action at all levels of government and the selection of the correct solution to a major metropolitan problem—and, at the time it was needed. While history so often seems a catalogue of past mistakes, it may here record a total success—built on metropolitan unity of thought and action.

This appraisal of the project is taken from the Wolman-Geyer Report of 1962:

> "This inter-jurisdictional project is a logical and essential part of the Regional Sewerage Plan. It is the most efficient, reliable, and cheapest method of collecting and transporting the sewage wastes from the areas tributary to the Potomac River above the public water supply intakes to the Blue Plains sewage treatment plant of the District. Its completion will insure that the objectives of the Regional Sewerage Plan for the Metropolitan Region can ultimately be achieved to a maximum degree in the area served by the interceptor."

APPENDIX

Excerpts from
Regulations for use of
Potomac Interceptor

ORDERED:

SECTION 2—Tributary Systems

A In general, connections to the Potomac Interceptor System shall be made only at the connection points provided, shall be limited to systems owned, operated and controlled by the governmental jurisdiction or agency involved, and shall be metered. Provision shall be made at each point of connection for sampling and for check measurements of quantity.

B Each jurisdiction shall require and enforce conformity to these regulations with respect to the tributary system and its parts, and, where applicable, with respect to individual contributors or groups of contributors thereto. Only sewage from separate sanitary sewer systems shall be discharged to the Potomac Interceptor. Such systems shall receive no storm water, directly or indirectly, from surface drains, ditches or streams; storm or combined sewers; roof, area-way or foundation drains or by any other means, except that the minimum practicable infiltration of ground water, in any case not to exceed 200 gallons per inch diameter per 24 hours, with a maximum of 5,000 gallons per 24 hours, per mile of sewer exclusive of house or building sewers, will be permitted.

C All new trunk, subtrunk or lateral sewers and appurtenant structures comprising tributary systems shall conform to the best current practice as to design, materials and workmanship, shall be of adequate strength to resist breakage, and shall be substantially watertight. Pipe lines shall be properly bedded or cradled, and shall be constructed using O-ring rubber gasketed or equally tight flexible plastic joints of type, materials and workmanship which will minimize initial and future infiltration. All new house or building sewers shall be of cast-iron soil pipe with caulked lead joints, Class XH, Extra Heavy, Federal Specification WW–P–401c dated June 4, 1963, in public rights-of-way and Class SV, Service Weight, in private property.

D The designs, plans, specifications and construction of new tributary systems and additions to existing systems, if any, which become tributary, may be subject to the review, inspection and concurrence of the District.

SECTION 3—Tributary Sewage

A Based on reasonable estimates, approved by the District, of the contributing population, the average strength, for any calendar month, of sewage discharged at a point of connection to the Potomac Interceptor, expressed as pounds per capita of Suspended Solids, of Biochemical Oxygen Demand, of Chemical Oxygen Demand, and of Chlorine Demand, in any of these categories, shall not exceed by more than 20 per cent values, similarly expressed, which are commonly accepted in conservative sanitary engineering practice for sewage of predominantly domestic origin from comparable areas. In cases where a significant percentage of the sewage is not of domestic origin, the equivalent population applicable to such non-domestic wastes shall be estimated on the basis of 100 gallons per capita per day.

B Sewage and wastes in the following categories may be discharged into tributary and connecting sewers for ultimate discharge to the Potomac Interceptor:

1 Sewage discharging from sinks, and the sanitary conveniences of dwellings, apartments, hotels, institutions, and commercial and industrial establishments and free from storm water and industrial wastes.

2 Industrial wastes which do not increase the strength of the sewage reaching the point of connection with the Interceptor beyond the limits stated above for Suspended Solids, Biochemical Oxygen Demand, Chemical Oxygen Demand, or Chlorine Demand and which contain no adulterants or components hereinafter prohibited.

3 The flow from domestic and commercial garbage grinders in dwellings, restaurants, hotels, stores and institutions, by which garbage has been shredded to such a degree that all particles will be carried freely under flow conditions normally prevailing in public sewers with no particle greater than ½ inch in any dimension.

4 Night soil and septic tank pumpage, by special permits, at such points and under such conditions as the District may stipulate in each permit.

SECTION 4—Prohibited Sewage and Wastes

None of the following described sewage, waters, substances, materials or wastes shall be discharged into the Interceptor and each governing body within the area served by the Interceptor shall prohibit and prevent any of such discharges from any outlet into any tributary or connecting sewer:

1 Any sewage, industrial wastes or or other wastes, solid, liquid or gaseous, which in the judgment of the District may cause maintenance difficulties, operating difficulties, conditions dangerous or detrimental to persons or property, or require any unusual provision, attention or expense of handling or treating.

2 Any trash, ashes, soot, cinders, slag, charcoal, sand, gravel, rags, bottles, cans, tree limbs, manure of domestic animals, offal, dead animals or parts thereof, street sweepings, snow, ice, unground foodstuffs and waste thereof, and any and all other solid objects, materials, refuse and debris not normally contained in sanitary sewage.

3 Sludges or other materials from sewage or industrial waste treatment plants or from water treatment plants.

4 Water which has been used for cooling or heat transfer purposes without recirculation, discharged from any system of condensation, air conditioning, cooling, refrigeration, or similar use.

5 Water accumulated in excavations or as the result of grading, water taken from the ground by well point, underdrain or other dewatering system, or any other drainage associated with construction operations.

6 Any liquid or vapor having a temperature higher than 150 degrees Fahrenheit.

7 Any water or wastes containing grease or oil or other substances that will solidify or become discernably viscous at temperatures between 32 degrees and 150 degrees Fahrenheit.

8 Any water or wastes containing emulsified oil or grease exceeding 100 parts per million of ether-soluble matter.

9 Any gasoline, benzine, naphtha, fuel oil, lubricating oil, or other flammable or explosive liquid, solid, or gas.

10 Any water or wastes that contain more than 10 parts per million of hydrogen sulphide, sulphur dioxide, or nitrous oxide.

11 Any waters or wastes having a pH lower than 5.5 or higher than 9.0, or having any other corrosive property capable of causing damage or hazard to structures, equipment or personnel of the Interceptor, other sewage handling and transporting facilities, or the treatment works.

12 Any waters or wastes containing a toxic or poisonous substance in sufficient quantity to injure or interfere with any sewage treatment process, constitute a hazard to humans or animals, or create any hazard in the waters receiving the treated or untreated sewage. The 24-hour average concentration of certain toxic substances in sewage as it arrives at the point of connection shall not exceed the following:

Iron as Fe	15 parts per million
Chromium as Cr (hexavalent)	5 parts per million
Copper as Cu	3 parts per million
Zinc as Zn	2 parts per million
Phenols	0.05 parts per million

At no time shall the concentration exceed three times the 24-hour average concentration limit stated above.

13 Any cyanides in excess of two parts per million as CN in the wastes from any individual outlet. The discharge of any cyanides in lesser amount shall be permitted only upon evidence of satisfactory continuous control of the concentration and volume of the discharge.

14 Any water or wastes containing the discharge of acid iron pickling wastes or plating solutions (unless satisfactorily treated prior to discharge to sewer system to conform to all other provisions of this Section).

15 Any exhaust gases, steam, malodorous gas or other substance which, either singly or by interaction with other wastes, is capable of creating a nuisance or hazard to life or of preventing entry into the tributary sewers or the Interceptor for maintenance, inspections or other purposes.

16 Any radioactive toxic isotopes of over 100 days half life. The radioactive isotopes I 131 and P 32 as used at hospitals are not prohibited if properly diluted at the source.

17 Any highly colored dye wastes, spent tanning solutions, or similar wastes.

18 Any swimming pool drainage, except that where a sanitary sewer is the only sewer available to the premises on which a swimming pool is located, pool deck drainage, waste water from scum gutters and automatic recirculating skimmers, filter wash water, and the pool contents may discharge through an indirect connection to such sewer; provided that the rate of discharge does not exceed fifteen (15) gallons per minute. In order that there shall be no interference with the rate of discharge of waste water from scum gutters, automatic recirculating skimmers, the back-washing of filters, or the draining of the pool or the entire system, a holding tank shall be provided. The means of controlling the rate of discharge from such holding tank shall be tamper-proof and may consist of a short length of one and one-quarter (1¼) inch pipe connected through the wall or the bottom of the holding tank to the sewer lateral. There shall be no means of bypassing such holding tank.

19 Any waste which by interaction with sewage or other wastes will produce any of the above prohibited substances.

SECTION 5—Permits for Connections

A Connection shall be made to the Interceptor only after an application for a permit has been made in writing by the governmental agency requesting the connection, on forms prescribed and furnished by the District, and only after permission has been granted by the District for such connection in accordance with the following:

1 SEWERS IN PLACE OR UNDER CONSTRUCTION. For sewers in place or under construction at the time these regulations, or the most recent revisions thereof, are adopted, the governing body shall furnish with the application for a permit for connection sufficient data regarding the connecting and tributary sewers and the users connected thereto to enable the District to determine whether or not the requirements of the regulations will be met. The District, after review of the data submitted, will designate what, if any, changes must be made in the tributary system or individual outlets to bring the connecting sewer and tributary system into compliance with the regulations. After these changes have been made to the satisfaction of the District, or, in special cases, after the governing body has adopted a program of corrections satisfactory to the District, the permit to connect will be given.

2 NEW SEWERS. For new sewer systems, the application for permission to connect shall be made before any construction is started on the tributary system. The governing body making the application shall submit complete plans and specifications and the basis of design for the sewer system. The basis of design shall show the population to be served and its distribution and shall describe the number and character of the commercial and industrial establishments estimated or expected to be served and the amount and characteristics of the sewage to be contributed by each. After review of the data submitted, the District will designate what, if any, changes shall be made to the plans and specifications to insure compliance with the regulations. After these changes have been made to the satisfaction of the District, the sewer system will be approved for construction. During construction, the work will be inspected by the District to the extent deemed appropriate by the District, and the governing body shall make any necessary provisions for such inspection. If such inspections, together with infiltration tests of the completed sewers, indicate that the sewer system has been constructed in accordance with the approved plans and specifications, a connection permit will be issued.

3 EXTENSIONS AND ADDITIONS. Connection permits issued in accordance with Paragraphs 1 and 2 above shall apply only to those portions of the connecting and tributary sewer systems for which descriptive data were submitted. Additional permits will be required for any extensions to these sewers or additional sewers which will discharge, directly or indirectly, into the same point of connection to the Interceptor. The procedure for obtaining connection permits for such extensions and additional sewers shall be as described in Paragraph 2 above.

4 PLUMBING REGULATIONS. Prior to making connection of its system with the Interceptor System, the jurisdiction shall enact, and thereafter shall maintain and strictly enforce, regulations governing plumbing work on private property within the areas to be served through the Interceptor, said plumbing regulations to be in consonance with the intent of these regulations.

Recognizing the practical problems involved in applying modern codes to old buildings, the District will not require that buildings existing prior to construction of the Interceptor be brought into immediate compliance with the requirements of these regulations. However, the jurisdiction must obligate itself to undertake eventual correction of such non-compliances as opportunities may arise by reason of remodeling, razing, reconstruction or other means.

5 METERING. Metering facilities shall be installed at all connections to the Interceptor and meter readings shall be used as the basis for charges to be made for the use of the Interceptor. Each application for connection shall include details as to type and size of meter to be furnished and installed by the connecting agency, and such agency shall provide the necessary easements or rights-of-way to permit convenient and safe access to the metering point.

6 OBLIGATIONS. Acceptance by the governing body of the permit to connect to the Interceptor shall constitute acceptance of all obligations and responsibilities to conform to the regulations and agreement to pay all penalties and damages hereinafter set forth for violations of the regulations.

7 EXCEPTIONS. With respect to the obligations imposed on jurisdictions and governmental agencies under Paragraphs 2 and 3 above, the Director of the Department of Sanitary Engineering may in writing grant to any jurisdiction or governmental agency exemption from (a) the requirements for the submission of engineering documents, (b) inspection of construction by the District, and (c) the securing of individual permits for each extension or addition to lines discharging through previously authorized connections to the Potomac Interceptor.

SECTION 6—Violations

Any governing body, authority or agency violating or permitting the violation of any of these regulations, including violation by one or more of the users of the tributary sewer system under its jurisdiction, will be notified by the District in writing as to the nature of the violation and requested to proceed without undue delay to the satisfactory correction thereof. If, within a reasonable time, to be determined by the District, remedial action is not taken, or action which in the judgment of the District may be reasonably calculated to secure correction of the violation has not been initiated, the District will proceed with the application of such administrative or legal procedures as may be expected to secure the desired result.

The governing body, authority or agency, as the case may be, shall pay for repair of any damages to the Interceptor, the sewerage system, or sewage treatment facilities of the District, any increased cost of operation and maintenance, and any personal liability or property damages assessed against the District, resulting from or caused by such violation.

By order of the Board of Commissioners, D. C.

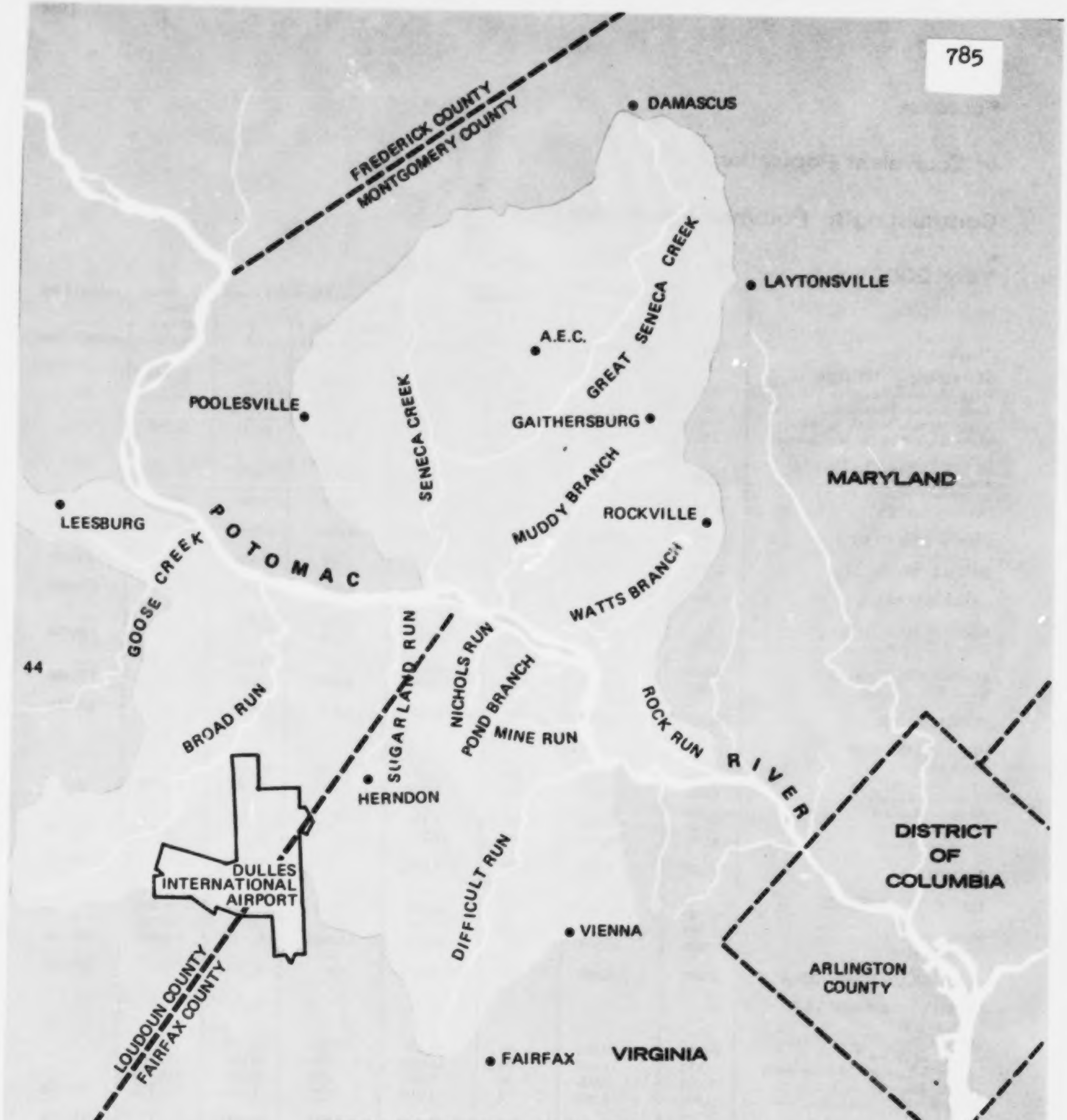
Forecast

# of Equivalent Population

Contributing to Potomac Interceptor

Year 2000

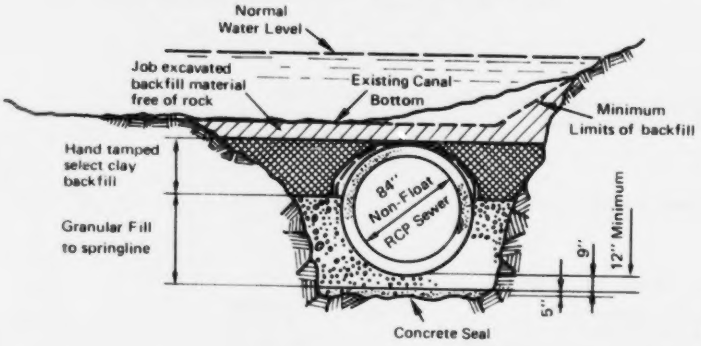
WATERSHED	ACRES	POPULATION	SEWERED		EQUIVALENT POPULATION		ACCUMULATIVE SERVICE BRANCH	POPULATION MAIN INTERCEPTOR
			PERCENT	POPULATION	INDUSTRIAL & COMMERCIAL	TOTAL		
BROAD RUN, VIRGINIA								
Main Horsepen, Fairfax	4,500	30,500	90	27,450	1,500	28,950	28,950	—
North Branch Horsepen, Fairfax	920	5,500	90	4,950	300	5,250	34,200	—
North Branch Horsepen, Fairfax	580	2,000	90	1,800	200	2,000	—	—
North Branch Horsepen, Loudoun	560	—	—	—	3,000	3,000	39,200	—
DULLES INTERNATIONAL AIRPORT	9,400	—	—	—	20,000	20,000	59,200	—
INDIAN CREEK	1,750	—	—	—	9,000	9,000	68,200	—
UPPER BROAD RUN	15,170	22,800	70	15,960	1,000	16,960	—	85,160
MIDDLE BROAD RUN	3,000	400	100	400	1,100	1,500	—	86,660
CABIN BRANCH	2,300	7,200	100	7,200	6,500	13,700	—	100,360
BEAVER DAM RUN	7,250	22,600	90	20,300	4,660	24,960	—	—
Russell Branch	2,330	11,000	90	9,910	1,690	11,600	—	136,920
LOWER BROAD RUN	3,200	1,500	100	1,500	—	1,500	—	—
Goose Creek (part)	13,000	50,000	70	35,000	2,000	37,000	—	175,420
POTOMAC NO. 1	3,900	1,730	100	1,730	1,850	3,580	—	179,000
SUGARLAND RUN								
South of Route 7								
Fairfax County	6,720	19,000	92	17,400	1,650	19,050	—	—
Loudoun County	1,200	6,300	80	5,050	1,680	6,730	25,780	—
North of Route 7								
Fairfax County	1,840	3,000	80	2,400	—	2,400	—	—
Loudoun County	4,100	16,970	80	13,570	—	13,570	41,750	220,750
NICHOLS RUN	4,700	4,700	70	3,290	—	3,290	—	224,040
MARYLAND SERVICE								
Seneca Creek	78,800	90,000	70	63,000	5,000	68,000	68,000	—
Muddy Branch	12,700	40,000	90	36,000	3,000	39,000	107,000	—
Watts Branch	14,800	35,000	100	35,000	3,000	38,000	145,000	369,040
POND BRANCH, VIRGINIA	3,000	3,000	70	2,100	—	2,100	—	371,140
DIFFICULT & MINE RUN SERVICE								
Difficult Run								
South of Route 7	28,840	122,600	70	85,830	8,300	94,130	94,130	—
Piney & Captain Hickory Runs	4,870	19,500	70	13,650	1,500	15,150	109,280	—
Rocky Run	2,890	2,900	70	2,020	200	2,220	111,500	—
Mine Run	2,300	2,300	70	1,610	100	1,710	113,210	484,350
ROCK RUN	6,400	25,000	100	25,000	2,500	27,500	—	511,850



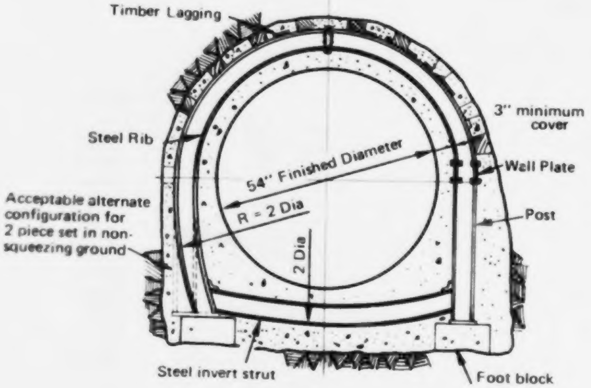
DESIGN POPULATION - YEAR 2000

VIRGINIA		MARYLAND	
Broad Run	179,000	Seneca	68,000
Sugarland Run	41,750	Muddy Branch	39,000
Difficult Run	111,500	Watts Branch	38,000
Nichols Run, Mine Run, and Pond Branch	7,100	Rock Run	27,500
Total	339,350	Total	172,500

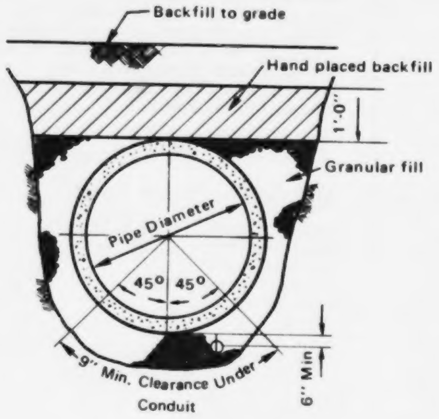
SPECIAL EMBEDMENT DETAIL IN CANAL

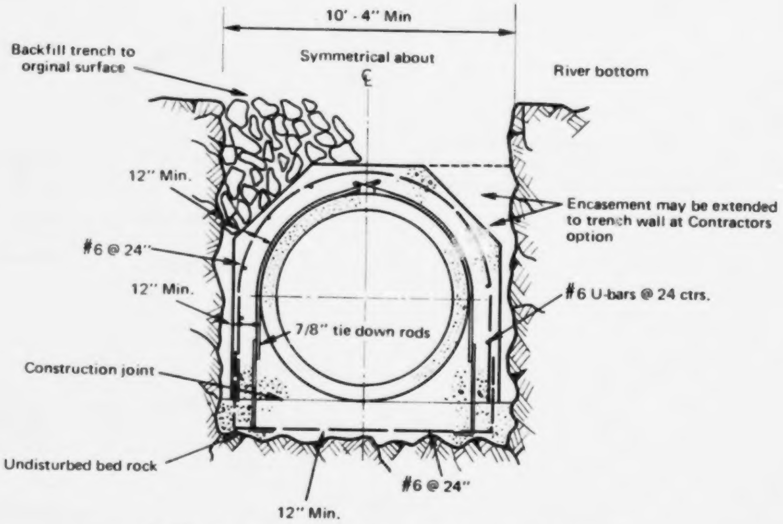

Normal Water Level
Job excavated backfill material free of rock
Existing Canal Bottom
Minimum Limits of backfill
Hand tamped select clay backfill
84" Non-Float RCP Sewer
Granular Fill to springline
12" Minimum
9"
5"
Concrete Seal

HORSESHOE BORE



PIPE OUTSIDE CANAL





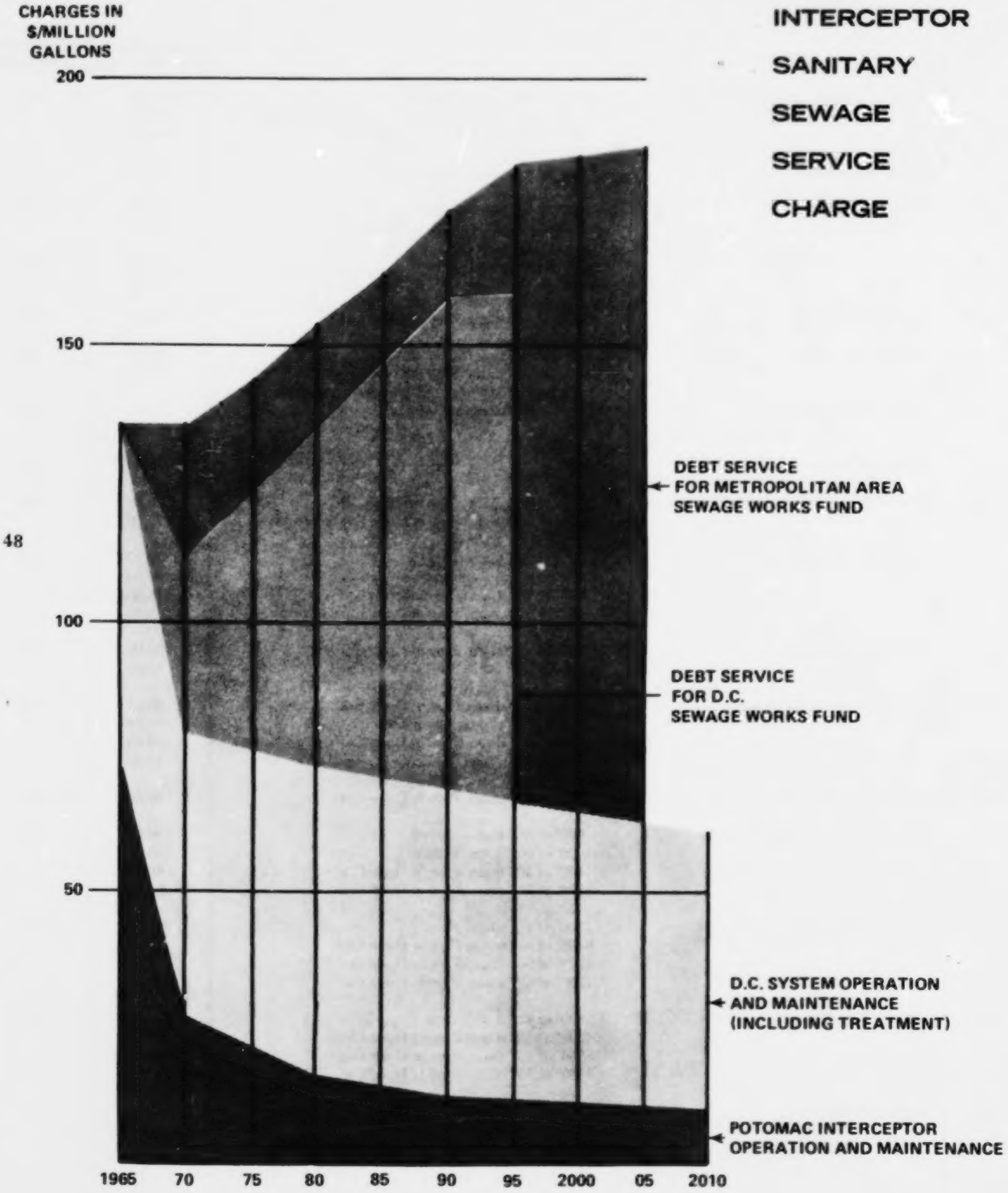
TYPICAL ENCASEMENT-POTOMAC CROSSING

	UNIT NO.			CONTRACT
		DEPARTMENT OVERHEAD		
		D.C. Administration and Engineering Salaries Rent, Office Space Miscellaneous Purchases, Reproduction, Postage, etc.	$ 305,650.00	
		CONSULTANT SERVICES—(Design & Construction)	$ 1,578,566.85	
		COSTS PAYABLE TO OTHER PUBLIC AGENCIES		
		National Park Service, Staff Expense—(estimated)	45,000.00	
		National Park Service, Adjustment of Facility	1,706.31	
		National Park Service, Planting and Restoration—(estimated)	150,000.00	
		National Park Service, Relocation of Mt. Glory graves	10,608.71	
		General Services Administration, Property Acquisition—(estimated)	250,000.00	
		U.S.A.C.E., Wash. Aqueducts, Staff and Pumping Charges	23,941.55	
		Federal Aviation Agency, Reseeding	3,105.00	
		Maryland State Roads Commission, Repairs Unit 10	54,828.14	
		Potomac Electric Power Co.	748.00	
		Sub-Total:	539,937.71	
		COMPLETED CONSTRUCTION		
	1	Virginia Tunnel & Potomac Crossing	4,125,673.98	18957
	2	Broad Run Tunnel	1,601,958.85	18958
46	3	Maryland Tunnel	1,841,832.46	18959
	4	Fairfax Loudoun Tunnel	983,532.22	18960
	5	Horsepen Tunnel	263,104.50	18961
	6	Difficult Run Tunnel	689,998.71	18962
	7	Cabin John Segment	2,731,811.00	18963
	8	Sugarland Segment	1,922,067.57	18964
	9	Nichols Segment & River Crossing	1,849,575.76	18965
	10	Anglers Inn Segment	2,325,046.60	18966
	10A	Rock Run Segment	95,500.00	18971
	11	Broad Run Segment	917,277.73	18967
	11A	Extension Across Airport	869,147.47	18972
	12	Difficult Run Branch	343,456.60	18968
	13	Upper Maryland Segment, Part I	998,201.97	18969
	15	Difficult Run Extension	560,753.79	18973
	16	Sugarland Extension	628,132.46	18974
		Emergency Bypass Structure	7,835.70	19574
		Sub-Total:	22,754,907.37	
		CURRENT CONSTRUCTION		
	14	Upper Maryland Segment Part II (Estimated)	2,475,000.00	18970
		Repairs to C & O Canal (Estimated)	150,000.00	20253
		Sub-Total	2,625,000.00	
		TOTAL	27,804,061.93	

PTOR SEWER COSTS

UNIT NO.			APPROXIMATE LINEAR FT. COST	CONSTRUCTION PERIOD DAYS
1	Virginia Tunnel & Potomac Crossing	13800′ of 78″ diam. Tunnel	$170.00	650
		3000′ of 78″ diam. Pipe in Open Cut Across River	500.00	
		1700′ of 54″ diam. Pipe in Open Cut	135.00	
2	Broad Run Tunnel	10800′ of 66″ diam. Tunnel	155.00	751
3	Maryland Tunnel	8500′ of 84″ diam. Tunnel	200.00	715
		600′ of 84″ diam. Pipe in Open Cut	125.00	
4	Fairfax-Loudoun Tunnel	4900′ of 72″ diam. Tunnel	170.00	527
		800′ of 72″ diam. Pipe in Open Cut	135.00	
5	Horsepen Segment	2400′ of 42″ diam. Pipe in Open Cut	110.00	247
6	Difficult Run Tunnel	3000′ of 66″ diam. Tunnel	195.00	294
		1000′ of 66″ diam. Pipe in Open Cut	110.00	
7	Cabin John Segment	1000′ of 78″ diam. Tunnel	250.00	431
		20200′ of 78″ diam. Pipe in Open Cut	122.00	
8	Sugarland Segment	20200′ of 72″ diam. Pipe in Open Cut	195.00	384
9	Nichols Segment & River Crossing	11300′ of 66″ diam. Pipe in Open Cut	90.00	549
		3000′ of 54″ diam. Pipe in Open Cut Across River	275.00	
10	Angler Inn Segment	800′ of 78″ diam. Tunnel	235.00	640
		1900′ of 72″ diam. Pipe in Open Cut	90.00	
		1800′ of 78″ diam. Pipe in Open Cut	115.00	
		15100′ of 84″ diam. Pipe in Open Cut	125.00	
11	Broad Run Segment	13800′ of 48″ diam. Pipe of Open Cut	50.00	305
		3600′ of 54″ diam. Pipe of Open Cut	65.00	
11-A	Extension Across the Airport	2700′ of 24″ diam. Pipe of Open Cut	20.00	403
		7200′ of 30″ Pipe in Open Cut	30.00	
		7800′ of 36″ diam. Pipe in Open Cut	38.00	
		3500′ of 42″ diam. Pipe in Open Cut	45.00	
12	Difficult Run Branch	5600′ of 54″ diam. Pipe in Open Cut	58.00	218
13	Upper Maryland Segment, Part I	800′ of 54″ diam. Tunnel	240.00	520
		1500′ of 66″ diam. Tunnel	240.00	
		1400′ of 36″ diam. Pipe in Open Cut	60.00	
		2500′ of 39″ diam. Pipe in Open Cut	80.00	
14	Upper Maryland Segment Part II	2200′ of 54″ diam. Tunnel	220.00	400
		5500′ of 48″ diam. Pipe in Open Cut	90.00	
		4700′ of 54″ diam. Pipe in Open Cut	100.00	
		7200′ of 60″ diam. Pipe in Open Cut	110.00	
15	Difficult Run Extension	300′ of 42″ & 48″ diam. Tunnels	190.00	368
		4200′ of 42″ diam. Pipe in Open Cut	36.00	
		3800′ of 48″ diam. Pipe in Open Cut	41.00	
		4400′ of 54″ diam. Pipe in Open Cut	46.00	
16	Sugarland Extension	6600′ of 36″ diam. Pipe in Open Cut	35.00	176
		7500′ of 42″ diam. Pipe in Open Cut	40.00	
		2000′ of 48″ & 36″ diam. Pipe in Open Cut	45.00	

POTOMAC INTERCEPTOR SANITARY SEWAGE SERVICE CHARGE



SECRETARY KLEIN: Mr. Jackson, because of the time, it now being 25 to 12:00, I will, if I may, preempt the first questioning and then pass the panel over to Mr. Murray Stein.

Do you know what the actual appropriations of the budget were in either 1968 or 1969 for water pollution control in the District of Columbia?

Or, rather, maybe I should put it a different way -- for operation of your Department, which would include more than just the District of Columbia, I believe. You have a great deal of area outside it.

MR. JACKSON: That's true, Mr. Chairman. However, we do not have it broken down.

SECRETARY KLEIN: The total amount of money that you get.

MR. JACKSON: Let me give you an idea. For the water pollution control plant alone, we are asking in the 1970 budget $11 million.

SECRETARY KLEIN: No. I am trying to determine how much it costs per day per person for water pollution control. How much money did you get altogether in the whole Engineering Department to take care of this in Blue Plains and your interceptor sewers for 1969?

MR. JACKSON: Mr. Chairman, I will have to get that. It won't take us long to do that, but we will have to furnish that for the record.

SECRETARY KLEIN: Maybe you could get it and get it into the record later today. I am just trying to figure out how much per day we are using for this.

We had figures yesterday of three cents per day per person, and 13 cents and 22 and 26 cents. Even cigarettes cost more than 12 or 15 cents per day.

Let's try to figure out how much, from your standpoint, we are putting in per day per person in this area on sewers, sewage treatment and pollution control, and see how this reacts with it.

You are talking now about $306 million. I would like to know how much it adds up to per day, and then you tell the people, and I think if they find out that they are spending a lot less for this than they are for cigarettes, we have a real point, and I think that is what we will find here.

MR. JACKSON: We can give you some figures along that line.

SECRETARY KLEIN: I might say to you that the whole posture of this conference is not criticism in what is going on, because I think I have said it many times that we all got caught short on pollution control. It caught us all short all over the country at once, and the whole technique of this conference and any other is to get constructive action to meet pressing problems.

I will ask you a question, and also ask Dr. Sawyer: Will your plans do the complete job for the area contemplated, the 90 per cent?

MR. JACKSON: For the entire area tributary to the plant?

SECRETARY KLEIN: Yes.

MR. JACKSON: Yes, sir.

Is that correct, Dr. Sawyer?

DR. SAWYER: Right.

SECRETARY KLEIN: Going a little further: Do you believe that the 96-98 standards, etc., proposed by the Federal Water Pollution Control Administration are necessary, or, in the alternative, is your 90 per cent removal without the nitrogen and phosphates removal good enough?

These are ultimate questions. We have to decide somewhere along the line which way we are going.

MR. JACKSON: This is pretty ultimate.

SECRETARY KLEIN: Yes.

MR. JACKSON: I can't answer that question.

SECRETARY KLEIN: Because the question then is, if we stayed with the 90 per cent removal, what happens to the Potomac with the growing population?

MR. JACKSON: It depends, I think, Mr. Chairman.

Again, I think we have to come back to the proposition of what he wants and what he is willing to pay for, and we have to propose what is adequate for that purpose.

SECRETARY KLEIN: That is not between you and me, Mr. Jackson.

We are the engineers. We are the ones who do the planning. It is up to us to tell them what we think is necessary, and then it is up to them to decide.

Therefore, the ultimate question is between you and me and the Federal Water Pollution Control Administration whether or not these standards are necessary in order to put the Potomac back into shape.

I take it for granted that you and I are agreed that 96-98 per cent are necessary in order to put the Potomac back into shape and that 90 per cent will not do the job?

MR. JACKSON: I don't think you could say that I am agreed to that.

We have always followed the principle, Mr. Chairman, that the people would tell the Government what they wanted and what they desired, and the engineers to try to provide it. I think my feeling here is that if it is the will of the people to direct us that they want a certain quality of water in the Potomac River, and they understand the cost and they understand what the results will be, and thoroughly understand this, then I say let's get on our horse and ride and go as far as we possibly can and get some money to do it.

SECRETARY KLEIN: If you then say to them that 90 per cent is sufficient, and five years from now we find the Potomac is worse than it is today, where are we at?

MR. JACKSON: I say that we have got to get 90 per cent and get to it as quickly as we can.

It is pretty obvious with the population increases, that what 90 per cent might do in 1980 would not necessarily be needed or a greater portion or a greater effort might be needed for the year 2000. I don't think there is any question of that.

SECRETARY KLEIN: Have you projected what 90 per cent removal will do to the Potomac if everybody abides by this?

MR. JACKSON: Mr. Chairman, I felt that the abilities of the Federal Water Pollution Control Administration, and they certainly demonstrated it yesterday, were sufficient to demonstrate that problem.

We have not projected it. We have taken those figures that you have furnished.

SECRETARY KLEIN: In other words, you go along with the 96-98 and potential nitrogen and phosphorus removal as being necessary to put the Potomac into position?

MR. JACKSON: I didn't say that.

SECRETARY KLEIN: No, sir. You are going to have to make a decision, then either the people will go along with your decision or they will not.

What is necessary in order to put the Potomac back into shape?

MR. JACKSON: I don't know, and I'm not sure that anyone here can tell us.

SECRETARY KLEIN: Do you think your 90 per cent job will do it, or is it a minimum plan?

MR. JACKSON: I think the 90 per cent job is one that we have got to do and get to as quickly as we possibly can.

We are getting only 70 now, which I thoroughly agree is inadequate. Let's get to the 90 per cent, and I think we are going to have to go higher.

SECRETARY KLEIN: Fine. That is the statement. I think we are going to have to go to the wire on that.

Mr. Stein, I will leave you now.

MR. JACKSON: Mr. Chairman, may I ask Dr. Sawyer to comment on that?

DR. SAWYER: Well, I can't say that I am an expert on the Potomac Estuary. I have to go by knowledge in other locations and try to extrapolate those to the Potomac Estuary.

With respect to removal of carbonation BOD and higher orders of BOD alone, you have to remember one thing: that what we are doing is hypothesizing a higher degree of mineralization of the materials that are sent to us, which means that we have then the nutrient problem at its worst possible degree, and you have to remember that these nutrients, when discharged into any body of water, will turn around and resynthesize for you the carbonaceous material through algal--

SECRETARY KLEIN: If I may stop you at this point, and I dislike breaking in, but we discussed this yesterday. I don't know whether you were here or not, but we combined with it nitrogen and phosphorus removal. Now you are discussing something that we went past yesterday, 96-98 per cent with removal of nitrogen and phosphorus in order to bring the Potomac back up to snuff, and then we also had to go into the question of removal of the fertilizers that come down from farms.

We have not gone into that far enough, so that we are talking about really bringing the quality in here and not just changing sewage pollution into nutrient pollution.

DR. SAWYER: I'm sorry, Mr. Chairman; I was not here yesterday so I don't know all that transpired, and if I am reiterating, why, I--

SECRETARY KLEIN: The question is: What does it do here? This is the question I asked. We are getting at the question: Is it necessary? What do we tell the people comes out of this conference?

Do we tell them just 90 per cent is

sufficient and you will have a good Potomac, or 90 per cent is not good enough and you will continue to have the Potomac in its present condition, as we seem to have from 1958 on?

Or, do we tell them that you have to do this if you want it, and then let them decide whether or not they want it at the costs projected?

This is the ultimate question.

Now, we are the pollution experts. What do we tell them?

DR. SAWYER: Again, I have to fall back on saying that all I can do is extrapolate my past experiences, and just what degree is needed in this location is a debatable issue and it will depend to a great extent upon the uncontrollable sources, the contributions from uncontrollable sources.

SECRETARY KLEIN: I'm sorry, sir; that is begging the issue, and if you say "uncontrollable sources," then all we can say is let it go to the dogs, and I refuse to accept that as a final analysis.

The Federal Water Pollution Control Administration made a good presentation yesterday, sir. I will ask you to refer to their items as to why they said

96-98 per cent and removal of nitrogen and phosphorus, and, if I may, I will not consider your answer at this time because you don't know what they all have in there.

MR. JACKSON: Mr. Chairman?

SECRETARY KLEIN: Yes, Mr. Jackson.

MR. JACKSON: I think Dr. Sawyer was referring to this area for which we don't have full knowledge now, such as the treatment of storm water and how we handle this.

SECRETARY KLEIN: Yes, sir, but we do have known factors, and what I am getting at is we have got to get to the known factors and then get into the unknown factors and find ways and means of harnessing them too.

It is not enough to say that there are unknown factors and therefore we should not treat the known factors within the best capabilities that we have today, and that is the point I was wishing to make.

MR. JACKSON: I think we have already said that.

SECRETARY KLEIN: Fine.

MR. JACKSON: I think I said that in my statement at the beginning.

SECRETARY KLEIN: If the conferees will excuse me, please?

(Whereupon, Secretary Klein left the conference.)

MR. STEIN: Thank you, Mr. Chairman.

Let me state this, because I think Secretary Klein has stated the problem clearly, and possibly the ultimate discussion in the conference should be directed, not just for you, Mr. Jackson, but to the other people, to this question as I see it.

Mr. Jensen, Mr. Cook's presentation, as I listened to it, indicated that if we were to meet standards of water quality which were adopted by all the jurisdictions here and the Federal Government, we would have to have the kind of treatment, the 96-98 per cent removal, that they suggested.

Now, if we do not do that, if there is any doubt about that, we should talk about it even if we can do it with less. But the point is, as I understood their statement, that if we don't do that we are going to get water quality of somewhat less character than the standards which we adopted.

If this assumption is true, either we go ahead with the program to go this high, if you think it is feasible, or else we tell the people that we are just not going to meet the water quality standards which we all have adopted.

This is, as I understand, the question. And I think the Assistant Secretary is driving at that, and possibly we should come up with this.

Do you want to make any statement? I will throw this open to questions or comments of Mr. Jackson and the District group. Are there any questions or comments?

MR. McKEWEN: Mr. Chairman, I have one question which is not to the topic, if you want to hold that --

MR. STEIN: No. You go ahead.

MR. McKEWEN: This is for Mr. Jackson and perhaps Dr. Sawyer.

On page 2 of Dr. Sawyer's presentation he states:

> "Flows from the combined sewer system in excess of 2 DWF, and up to 5 DWF, will receive primary treatment and disinfection with chlorine before discharge."

And beyond prime times they will be bypassed.

The question I have is whether or not there is some information on all this, on the quality of waste we are talking about when it does happen, and a projection on the impact that this will have on water quality?

MR. JACKSON: Mr. McKewen, we do have figures. I don't have them here with us. We can certainly give you this.

As to the last part, I am not sure again that we have calculated the impact on water quality, again deferring this to the general studies on the Potomac River by the FWPCA, but we do have figures and calculations with respect to two times the dry weather flow and five times the dry weather flow and the impact it will have on the sewage treatment process.

Dr. Sawyer has that, too, and I am sure we will be glad to furnish that.

MR. McKEWEN: Thank you.

MR. STEIN: Are there any other comments? Mr. Paessler.

MR. PAESSLER: Let me ask a question here that possibly will clarify the previous question.

Wouldn't it be true that if phosphates and nitrogen removal--that is, nutrient removal--were instituted, this would automatically raise the degree of BOD removal?

MR. JACKSON: It is my understanding that this metnod might provide really the most economical in latter stages of BOD removal.

In other words, we would get the increase in BOD removal from the 90 which we anticipate to perhaps a considerable degree. I don't know that we have actually expressed it, but I would assume five to six per cent with the advanced waste treatment process. That is my understanding.

Dr. Sawyer, you can correct me if I have not answered properly.

MR. STEIN: Are there any other comments or questions on the District of Columbia presentation?

MR. JACKSON: Mr. Chairman, I might just make one comment.

MR. STEIN: Surely.

MR. JACKSON: I think that our position has been stated and agreed to by FWPCA in the establishment of our water quality standards.

We came to the position that we would go for 90 per cent removal and advanced plans to do that--that I think is where we stand--certainly within the next five-year period.

We recognize perhaps the need of and seeing that we have got to go into higher degrees of treatment, and we are planning for that in our report, as we have mentioned, but I would like to cite the fact that we and the Federal Water Pollution Control Administration are agreed on the water quality standards.

MR. STEIN: I don't think there is any doubt from what you said before, but, again, let me pose the question as I see it here.

Some pilot work has been completed at the plant and in other places. The Federal Water Pollution Control Administration has come in with a recommendation calling for considerably higher than 90 per cent removal of phosphates and BOD in order to achieve the standards.

We have heard the view that your program now is to go up to a 90 per cent removal within five years, and we have not resolved that other question that these people have brought up.

We have heard the Assistant Secretary,

and if I read him correctly--and I don't think there is any doubt about this--he is going to pose the question to resolve it, what we do above the 90 per cent as a result of this conference, whether we are going to do that or not, and if we don't do that, how much below the standards will we come?

If I understood his last point, if we just go for the 90 per cent, will we really find ourselves with a polluted river without having decided the other question now for the next ten years?

MR. JACKSON: I think I understand that question.

But one further comment: to spend $108 million for 90 per cent removal even over the next five years, if I understand our consultant's report, is going to require $20 million the first year and perhaps a $40 million expenditure over the next three or four, and then dropping back to 20, and this is a tremendous amount of money to get under way and get contracted in five years' time for just 90 per cent removal.

We would build at that time for nutrient removal as well, since our plans contemplate the need for nutrient removal, but I would point out that this is a tremendous rate of expenditure of money to be able to just physically get into operation.

Thank you.

MR. STEIN: Yes, Mr. Hope.

MR. HOPE: May I say that I recognize the problem.

I think the one dimension that has not been brought into the discussion is the time dimension.

Here again I think we would agree that the better effluent we contribute to the river the better off we all are. How quickly this can be done is the element really that is under discussion.

MR. STEIN: Mr. Hope, I would think that that may be an avenue that the conferees may want to explore. If we can agree upon what has to be done, then the time element comes in.

There is one other point, Mr. Jackson, because I don't think the District is any different than the usual city in this country in this respect.

MR. JACKSON: Have you ever lived in the District, Mr. Stein?

MR. STEIN: Yes, I did. When I first came to Washington, I didn't know that there was anything else here. It took me several years to learn that there were suburbs.

I think in all cases what we have experienced is slippage, once we set a time schedule in waste treatment control.

This is not only true here. If you read the New York Times, you find that they are having the same controversy in New York City right now and it has been raging for the past week.

The point is that we set a schedule back in the 1950's. We still have not gotten that interceptor completed, and there may very well be good reason for it. There were certain problems with other elements of the construction here.

The question here is -- and I think this is the question that the Assistant Secretary is putting forth because he is very familiar with this in his home State of Illinois -- that if we embark on this 90 percent reduction program and the five-year business and don't set the sights higher with a schedule now, given the past experience of slippages that we have, are we condemned to having a relatively polluted river for the foreseeable future or, at least, during the lifetime of our people here?

I think these are the questions. I am not providing an answer, but I think we have to resolve them.

Are there any other comments?

MR. HOPE: I wanted the privilege of the podium once more.

Why don't you go ahead and ask your question.

MR. JOHNSON: You are one of my commissioners, and I always defer to commissioners. However, I am a little bit confused right at this point.

The figure that you are talking about, 90 per cent removal of five-day BOD, is this going to include any nutrient removal facilities?

MR. JACKSON: It does not. The 90 per cent will simply be BOD and suspended solids--in other words, in general terminology, organic material.

MR. JOHNSON: Now, another question, if I may: You mentioned there is a possibility of Suburban Sanitary possibly going into a new treatment plant?

MR. JACKSON: I would like to correct that as far as the use of the word "possibility" is concerned.

It is, as I expressed a thought, an idea that one would have to consider if we go into this type of a plan. This, I think, WSSC certainly was to do.

MR. JOHNSON: This is my question. Has there been any consideration of this officially, or is this strictly a thought?

MR. JACKSON: At this point, there has not been any official consideration of it that I know of.

MR. STEIN: May I just make one comment before you start, Malcolm, because I think right on this Mr. Jackson raised a very interesting point, and I think he put it in the summary of his statement.

The point is this: We went in for an 80 per cent reduction in gathering of wastes at the Blue Plains plant in the 1950's with the notion that there would be no effluent treated or untreated going in above it for a distance.

Now, if you are going to come up -- and I am not saying you are -- with a plan to remove 96-98 per cent, which, as Mr. Jackson points out, might improve the water of the Anacostia, I think this reopens the question of gathering all this waste to a single point, or if we are going to have this high degree of treatment, whether we should not consider multiple points of discharge?

I think this is a very good question.

MR. JOHNSON: That is exactly the reason I raised this question.

There is another reason for it. Reference was also made to the trunk line.

MR. STEIN: That's right.

MR. JOHNSON: And so this puts a time limit on this kind of a consideration, I would think.

MR. JACKSON: I don't think there is any question but what it puts us on a very tight time schedule.

I mentioned this, I think, in my statement. It took us three months to plan for this pipeline coming down the Anacostia, and we must have some other consideration of this.

MR. STEIN: Mr. Hope.

MR. HOPE: I assume that this then completes the discussion relative to Mr. Jackson's comments.

There are two other elements that relate to the presentation from the District of Columbia. We have received from the Potomac Electric Power Company a written statement which has been submitted for the record and which deals with the problems that they are confronted with relative to the matter of thermal pollution from their three generating plants in the metropolitan area.

In the interests of saving time, I can summarize the statement by saying that they are concerned with meeting the established criteria. The statement expresses the interest and hope of working with us in the District in solving the problems and initiating specific studies during the coming summer months to find out what in fact the actual problem is.

MR. STEIN: Without objection, that statement will appear in the record as if read.

(The above-mentined statement follows:)

Potomac Electric Power Company

CONFERENCE ON POLLUTION OF THE POTOMAC RIVER - WASHINGTON METROPOLITAN AREA

Washington, D. C., April 2, 1969

Statement of Potomac Electric Power Company

Potomac Electric Power Company supplies electric service to the public in the District of Columbia, in approximately 60% of Montgomery and Prince George's Counties, Maryland, and in a small portion of Arlington County, Virginia. In addition, it supplies, at wholesale, most of the electricity distributed to the public in Charles, Calvert and St. Mary's Counties, Maryland.

We presently have five operational generating stations, and a sixth one under construction. Our two largest existing stations, Dickerson and Chalk Point, are located in Maryland, about 30 miles from the District's zero milestone, and the site of the station now under construction is likewise in Maryland, about 35 miles from the zero milestone.

Potomac Electric Power Company

Of our other three generating stations, two are in the District of Columbia -- the Benning Generating Station, on the Anacostia River at Benning Road, N. E., and the Buzzard Point Generating Station, on the Anacostia at 1st and V Streets, S. W. -- and the third, called our Potomac River Station, is on the Potomac River in Alexandria, Virginia. All three of them use the waters of the District of Columbia for steam condensing purposes.

Understanding as we do that the temperature criteria in the District of Columbia's Water Quality Criteria Implementation and Enforcement Plan, as amended, apply to the entire stretch of the stream after reasonable allowances are made for the mixing and dispersion of the water discharged from the generating stations, we believe that the answer to the question of whether or not the water discharges from those three "in-city" generating stations will conflict with the applicable temperature criteria basically will depend on what are the respective "reasonable allowances" for mixing and dispersion to be made at the three station sites.

Such being the case, we propose to proceed as follows:

1. During the summer of 1969 we will conduct

at each station comprehensive tests and studies of the receiving water, and its temperatures, with a view to establishing actual temperatures during high water temperature periods and other data useful in determining the locations and sizes of the mixing and dispersion zones which would be reasonable at the respective locations. We hope that those tests and studies can be conducted in cooperation with the concerned local agencies, such as the District of Columbia's Department of Health.

2. Following completion of that program and the evaluation of the results of the tests, we will endeavor to reach agreement with the concerned local agencies upon the appropriate mixing and dispersion zones for the three stations.

We are more confident that the temperatures at the Potomac River and Buzzard Point stations will be found not to be in conflict with the applicable criteria than we are with respect to the temperatures at the Benning station, because of the nature of the Anacostia River at that location.

Adequate generating capacity is required at Benning in order that we may have sufficient generation in the "in-city" area to provide protection against large outages of high voltage transmission ties elsewhere on our system and for voltage control during periods of heavy load. Accordingly, our plans call for an additional 275 megawatt (net) unit (No. 16) to be put in operation at Benning in 1972, to operate on a closed circuit condensing water cooling tower (as does the similar 275 megawatt unit No. 15 which was there placed in service in 1968). The completion of such unit No. 16 will, we believe, enable us to retire the station's old 200 psig turbine-generators not later than 1973. Such retirement will reduce the station's maximum possible use of river water from a total of 394,500 GPM to a total of 203,500 GPM. The physical conditions at the station are such as to make it impossible for us to substitute cooling towers for this river water usage.

The sand bar downstream from our discharge tunnel outlet at Benning, which developed after a storm sewer outlet was installed by the District, during the 1930's, approximately 300 feet below the Benning Road bridge. has created a physical situation which contributes very substantially to the serious recirculation of our condensing water which occurs in the river. The removal of the sand bar would greatly reduce such recirculation and thus lower the station's water intake and discharge temperatures, and we strongly recommend that all concerned make every effort to have the bar removed by the Corps of Engineers or other appropriate agency.

If, because of the water quality criteria or for other reasons, we were denied the use of any of our generating units at Benning, or at Potomac River or Buzzard, during the summer months (which is when they are most needed and when the natural temperature of the area's waters are at their highest and their heat dissipating and diluting capabilities are at their poorest), it could be a serious matter for the Washington Metropolitan Area, because it could quite possibly lead to a shortage of electrical supply capacity in the area which might require substantial load shedding on our part with attendant hardship on our customers. Relating the importance of such a possible downgrading of electric service to the present deplorable quality of the area's waters (to which, we are convinced, our present discharges of heated water make no significant contribution),* we submit that any such shutdown of the plants would be an unreasonable step incompatible with the public interest.

Accordingly, we suggest that the welfare of the Washington Metropolitan Area requires that at least until such time as the basic conditions which cause the area's water to be in their present poor state are overcome, there should be no imposition or application of water discharge thermal standards which will prevent us from continuing to operate our three "in-city" generating stations in the manner dictated by our load requirements.

Attached is a tabulation of data as to the water uses, and the temperature rises through the condensers, of the units at our three "in-city" stations.

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* "Potomac River Water Quality, Washington, D. C., Metropolitan Area," published in 1969 by the Federal Water Pollution Control Administration, U. S. Department of the Interior, says in its Summary section that "... the Potomac River Estuary in the Washington Metropolitan Area remains grossly polluted due to inadequate sewage treatment, the rapid population growth, and the discharge of combined sewer overflows and raw sewage."

Respectfully submitted,

POTOMAC ELECTRIC POWER COMPANY

[illegible] AT BENNING, BUZZARD POINT AND POTOMAC RIVER GENERATING STATIONS

BENNING	GPM	TEMPERATURE RISE °F
Unit 4	20,000	16
5	20,000	16
6	37,000	10
7	37,000	10
8	37,000	14
9	40,000	14
Sub Total	191,000	12.9 (b)
Unit 10	52,000	12
11	52,000	12
12	52,000	12
13	47,500	15
PRESENT BENNING TOTAL	394,500	12.8 (b)
BENNING TOTAL AFTER 1973	203,500	12.7 (b)

BUZZARD POINT		
Unit 1	50,000	10
2	50,000	10
3	74,000	10
4	74,000	10
5	74,000	10
6	74,000	10
BUZZARD POINT TOTAL	396,000	10 (b)

POTOMAC RIVER		
Unit 1	66,900	14
2	66,900	14
3	60,000	14
4	60,000	14
5	60,000	14
POTOMAC RIVER TOTAL	313,800	14 (b)

Notes:

(a) These units are proposed to be retired not later than 1973.

(b) Weighted average based on GPM.

MR. HOPE: The other presentation that has been scheduled is by Mr. Norman Loe.

Mr. Loe is the Director and past Commodore of the Washington Yacht Club.

I had the privilege of meeting him about two weeks ago at the time that we presented to the District Council some proposed regulations relating to the subject of sediment control and also the problem of disposal of wastes from water craft, the latter point, incidentally, one which had not reared its ugly head during the course of these discussions, and yet nevertheless is a problem as it relates to improving the quality of the waters of the District.

I understand that Mr. Loe has a short statement which he would like to present at this time, and I would like to accord him the privilege of the podium.

Mr. Loe.

STATEMENT OF

MR. NORMAN LOE

DIRECTOR

WASHINGTON YACHT CLUB

WASHINGTON, D.C.

MR. LOE: Thank you, Mr. Hope.

Mr. Chairman, conferees, ladies and gentlemen:

The first two pages of my presentation are copies of the statement I made at the D.C. City Council hearing that Mr. Hope referred to.

My name is Norman Loe, I am an engineer and boat designer. I speak primarily of the Anacostia because of our location.

First of all, I wish to say a word of appreciation for the good work the sanitation department has done in reducing the sewage pollution problem. Just a few years ago sewer gas bubbling in the Anacostia was reminiscent of the crater of an active volcano. The air was so thick with the stench from the gas and from the Kenilworth Dump it could have been cut in chunks and sold for fertilizer. The improvement has been so great that we now have mallard ducks feeding on cracked corn and mergansers diving for food and coming up alive. The City Council might soon issue duck stamps?

Trash from Kenilworth, Cottage City and debris from banks all the way to Peace Cross is mostly the result of poor housekeeping and the need for the trash boats could be reduced if trash were not pushed into the river at the dumps and a few traps were used along the sea walls.

We are heartily in favor of the antibulldozing regulations and hope that Federal legislation will give us clear water once more all around the country. Stuart Petroleum, the Gas Co. and Hess Oil Co. continue to be sources of pollution from oil from time to time but they are aware of the problem and are trying to control it. Pepco's thermal pollution is both beneficial and detrimental. Their cinders are extremely abrasive in our water pumps.

Your proposition of pumping out holding tanks is considered to be highly impractical from an enforcement point of view. The harbor police can't even control speeders, which are easily visible, after having a six-mile speed limit for several years so how can they be expected to detect and control pumping of holding tanks by boatowners who wish to avoid marina fees for the service? The better system would be the macerator-chlorinator such as Groco or Raritan with an acceptable coliform count. An item for checking these systems should be added to the Coast Guard's checklist for their boarding inspections. Action by the Council on holding tanks should be deferred until the Federal legislation is implemented. You could cause a great deal of confusion and unnecessary expense to boatowners by taking action now when it is apparent that the new Federal legislation will undoubtedly negate any action you might take.

The idea of showers and heads on shore is not bad, although a mandatory combination of Right Guard and Raid should be available for some boatmen who ignore such facilities. Please bear in mind too, that many communities in various parts of the country invest heavily in facilities that are then provided to the boat owners at nominal charges just to bring in the business resulting from their spending. National Capital Parks has done well in some repsects with regard to facilities although they have seriously inhibited progress in some ways, particularly with regard to private initiative and investment in facilities.

In conclusion, you can count on the cooperation of many boat owners who want clean clear water and good facilities. It should not be necessary for you to take my foregoing comments with a grain of salt because I expect to leave Washington shortly and whatever decisions you make will have little effect on me personally. I am sticking my oar in on this hearing because I like boating and would like to see our waters in better condition all around the land.

* * *

March 26, 1969

POTOMAC RIVER POLLUTION (a supplement to the Washington Yacht Club statement presented at the D.C. hearing on March 12, 1969)

Mr. Chairman, my name is Norman Loe. I am an engineer, boat designer and director and past commodore of the Washington Yacht Club.

If your regulations and requirements of boat owners are reasonable and judicious, you will obtain cooperation from a majority of owners. If your regulations and requirements are unreasonable and not universally applied, no amount of enforcement can achieve compliance let alone cooperation.

Can your experts answer the following questions for us?

1. What are the standards or degree of treatment now being achieved and hoped for at Blue Plains and other treatment plants in the area? This obviously has already been answered.

2. How does treatment by macerator-chlorinator units such as Raritan and Groco compare with the above standards?

3. Why do you even consider the possibility of requiring holding tanks when the effluent from them is pumped through a half-baked treatment process and dumped back into the river? The "holding tank-pumping out" concept proposed by D. C. is obviously ridiculous when:

a. Macerator-chlorinator units afford higher treatment standards than your treatment plants.

b. Macerator-chlorinator units can be installed in a larger number of boats because of their smaller size and weight.

c. No amount of enforcement will prevent many boat owners from pumping out their holding tanks while under way or at night in or out of marinas. The holding tank concept practically guarantees that you will have some raw effluent pumped into the river and the remainder being pumped through the municipal plants half treated.

Recent events in New York have proven that you cannot lay it on the boatowner and obtain compliance with limited area regulations especially when other pollution sources overwhelm the area. Your regulations must be consistent throughout the country.

It is extremely difficult to comprehend how the Princess can feel the pea under the mattress when the mattress is lumpy as hell. We will be happy to remove the pea from under the mattress if you will remove the lumps. We want clear, clean, swimmable, fishable, boatable and skiable water.

The pea in this case is smaller than you think. Most boats with heads installed are used less than five per cent of the days in a year. During this minimal amount of use the owners voluntarily restrict or discourage use of the heads for three good reasons. First, the owners have to clean the head compartment especially after a rough and bumpy ride on any Saturday or Sunday. Second, any Marine head is prone to malfunction and any owner hates to clean up and take the damned monster apart after it becomes hopelessly plugged. Third, anyone prefers to ascend the throne in comfort ashore without being cramped and bounced about in the typical marine head. We have, at times, made book on the foot race after docking.

The pea in this case then undoubtedly is of less consequence than the gangs of kids roaming the area and piddling off the seawall on any day of the week.

Can you tell us when the lumps will be removed from the mattress?

1. When will the sewage treatment plants achieve the standards equal to macerator-chlorinators?

2. When will D.C. and the Maryland and Virginia communities stop pushing trash in the river?

3. Will you stop the dumping of cinders in the river? They have cost the boatowners untold thousands of dollars in pump and engine repairs. (Can anyone here tell us the source of the cinders, whether it is Pepco, the Government or others?)

4. Is there acid content in Pepco's cooling water discharge? Some such condition has created one huge storage battery in the Anacostia with the resulting loss of thousands of dollars to electrolysis eating on our boats and equipment.

5. Can Pepco dump their hot water in the

winter and cool it in summer? We appreciate the ice free harbor but we would like to see the fish and wildlife return. Please do not allow them to ruin the lower Potomac with cinders, acid and thermal pollution from Morgantown.

6. Will the Federal Government pass anti-bulldozing laws and enforce them? Perhaps the real estate lobby is too powerful for such effective action. Would anyone care for a swig of Maryland-yellow mud? We permit careless, irresponsible communities to let their real estate developers run rampant and scalp the countryside then we pay good tax dollars for the Army Engineers to dredge their dirt and filth out of our harbors and rivers. How stupid can you get?

7. Will National Capitol Parks and/or the Army Engineers cut enough ramps in the seawall so dogs and other animals can escape drowning? I might have brought one of the over-ripe carcasses with me but my sensitive nose cannot stand the odor even from a distance. Perhaps the SPCA would take an interest in this point.

8. Can you eliminate flyash from your incinerators at St. Elizabeth's and your S. E. division?

We get frustrated and rebellious when you ruin our freshly painted topsides.

9. Oil spills continue to be a major lump in the mattress even though the companies try. Is the Federal Government working with the oil companies to achieve an acceptable system for containing and cleaning up the spills? Esso has developed a chemical system for removing oil spills that seems promising. What are you doing to promote its acceptance or improve its effectiveness? Or do you sit back and say "not yet" it is not good enough?

On Saturday night, after the March 12th D.C. hearing, the Hess Oil Co.had a big spill of bunker "C" in the Anacostia at South Capitol Street. Our oily mallard ducks, even though loggy and sick in appearance, seem to be surviving; the mergansers are gone. Our dog got into it. The Hess Oil Company's insurance people have injected the usual "independent adjuster" with the usual bickering and waste of time in arguing over settling boatowners' claims. How is it possible to justify one-half price on cleaning a boat or replacing a mooring line like this. We will have to live with this crud for weeks on end now. We still have to go after the oil companies when they spill. They don't come around to clean up voluntarily.

At this point I would like to ask officer Frantum of the U. S. Park Police to present his evidence of the above spill to show you the kind of mess we live with from year to year.

10. You already have laws on the books concerning some of these lumps. How do you expect to enforce new laws when you can't enforce the old laws. Can your legal eagles give us a resume of the applicable laws and regulations that are on the books now and tell us why they have not been enforced?

In conclusion: Token compliance is not enough. We need cooperation. Contrary to the view of many people cooperation is still a two-way street and can only be achieved by hammering out reasonable and workable regulations.

If you will work at removing the lumps, we will work at removing the pea. The pun is intentional!

MR. STEIN: Are there any comments from the conferees?

(No response)

MR. STEIN: If not, may we have Mr. Ted Pankowski of the Izaak Walton League? Mr. Pankowski.

MR. JACKSON: Mr. Chairman, before we get to that, I would like to make one observation, that the FWPCA technical report that was received indicates that only 42 per cent of the nitrogen input into the upper Potomac Estuary is from waste effluents.

In our feeling, there is not sufficient evidence to indicate a hundred per cent removal of that 42 per cent would really eliminate algal blooms.

It also raises another question: With the removal of phosphorus without removing the nitrogen, there is a possibility that the algal species might be changed rather than really eliminating the algal blooms themselves.

I just wanted to mention that point.

MR. STEIN: Yes, I think those are good questions. I know Dr. Bartsch is gone, but perhaps before the discussion is finished we may try to get answers to those questions, because I think we were heading towards those questions, Mr. Jensen.

MR. JACKSON: Thank you.

MR. JENSEN: Mr. Chairman, it seems to me that some of the answers that we have on the questions of nitrogen are not as firm as the ones we have on the phosphorus, and, hopefully, we can discuss the technical aspects of the nitrogen problems perhaps even subsequent to the conference, but we feel very certain about our position on phosphorus and BOD.

MR. STEIN: Thank you. Mr. Pankowski.

STATEMENT OF
MR. TED PANKOWSKI
CONSERVATION ASSOCIATE
IZAAK WALTON LEAGUE OF AMERICA

MR. PANKOWSKI: Thank you. Mr. Chairman and ladies and gentlemen:

I speak officially for the National Izaak Walton League in welcoming this enforcement conference after more than ten years of continued degradation of the Potomac River.

As you know, we are a national organization of private citizens who are expending our resources and energies to work for the improvement of life in our Nation through the wise use of our natural resources. Certainly no resource is as basic for a multitude of human needs as clean water, and what happens to the Potomac River will undoubtedly serve as an example of what the

American public can expect for our water resources everywhere.

Mr. Chairman, through the years the Potomac River has rightly been termed the "most studied river in the world" or the "Nation's heritage and pride," an object to be a "model of scenic and recreational values." The Izaak Walton League is disturbed, and we feel most citizens in the basin are disturbed, that in fact the Potomac River has been studied to death; that instead of a model for conservation, the river will not even serve as a usable resource for some of the most pressing human needs of the Washington metropolitan area; and further, that if the Potomac River is an example for the country, we as a people have much more to fear and much more to lose through the continued pollution of our waters than we ever dreamed of.

For the tragic irony of it, Mr. Chairman, is that while we are spending millions for wholesome neighborhoods, parks, and recreation opportunities and billions on hardware, we are hesitant to spend what it takes to protect and clean up the finest opportunity we will ever have. The Marine Resources Council reported last year that 75 per cent of our people live along a major water resource. Twelve of our largest cities are so located. Twenty million children live in these metropolitan areas within sight of a potential water recreation area denied to their use. The Potomac River Estuary is certainly among them, and the League is pleased that the Federal Water Pollution Control Administration pulled no punches in documenting in its current report what most people know intuitively. An increasing number of inadequate and poorly located sewage treatment plants have made the River unpleasant and dangerous for human contact; that silt depositions are rendering many areas unsuitable even for navigation; that trash and debris from construction sites and dumps, particularly along tributaries, such as Hunting Creek, are finding their way into the River; and even the value of that river as open space in a crowded metropolis is continually threatened by applications for landfills--unlike Lake Erie, the river is still good for sunsets.

A reasonable man could almost assume that the general public has written the river off as a lost cause, but this has not been the case. In Virginia, for instance, a group of citizens organizations are bringing suit in Federal Court to prohibit a landfill.

County governments are being urged to enact and enforce strict silt and erosion control ordinances, and better land use planning. Nationally, communities are responding with bond funds whenever asked to do so. In the Potomac Basin, people are getting involved and are expecting that the Potomac be restored for fishing and other recreation uses, for water supply, and for whatever other values the future may place on it.

We were pleased to note several recommendations by the Federal Water Pollution Control Administration in this regard and we wholeheartedly support them. We have others to add:

1. This conference should be expanded beyond consideration of the Potomac Estuary. I have reports from League members along the South Fork of the Shenandoah River, a major tributary, that the detergent load near Front Royal, Virginia, is so high that sudsing occurs simply by passing water samples from one glass to another, and that on occasion, high drifts can be observed near bridge abutments and other structures. It is alarming to note that FMC Corporation in Front Royal, a firm which uses detergents in its processing, intends to expand its Viscose Plant there to produce an additional

160 million pounds of polyesters. It will also generate 200 to 400 new jobs, and that's fine, but how much additional waste will be dumped into the South Fork of the Shenandoah and eventually the Potomac! The public has a right to know what this expansion is going to cost. We were pleased to note, incidentally, that the Virginia Water Pollution Board moved to take action on this two weeks ago--a step in the right direction.

From League members in West Virginia we hear reports that the ground water supply of Berkley County, a Potomac River drainage, is being contaminated, and while I am not able to substantiate this, we believe these reports are worth looking into.

2. Our second recommendation is that the record of this Conference be kept open with the view toward calling a formal hearing. We do not believe another ten years should go by before we will know whether there will be any substantial gains in the quality of this river.

3. We believe it essential that a regional organization of the parties of interest adopt and implement plans for the location of sewage treatment plants and for other waste disposal. Several years ago citizens

in Fairfax County, Virginia, where I live, were asked to approve a $20 million bond issue for sewers. They did so on the assumption that the funds would provide for the needs of the existing population (at that time, and help clean up the Potomac sewering). All the funds did was to provide an incentive for the extensive development of the entire Pohick watershed where a population of over 100,000 people is now expected. The plant to handle these effluents will be the Potomac across the River from the Piscataway Plant in Maryland. Further, additional plants are scheduled, or at least being thought of, for location around the entire Masons Neck area. In our view the combined discharge load of these numerous plants will be no different than the larger plants now operating in the District and in Alexandria, and we wonder whether badly timed development and poor planning is going to ruin another section of the River.

4. Serious thought should be given to installing and converting existing plants into advanced treatment facilities. For the long pull, and the ultimate population projected for the basin seems to bear this out, the only real, permanent solution to our pollution problems here as elsewhere is going to have

to be the recirculation of wastewaters and other types of advanced treatment. The Potomac River would be a suitable place to do more in this direction. The League urges that a formal request for State assistance for Fairfax and Loudoun and Prince William Counties for treatment works be made.

6. The Corps of Engineers should be required to remove depositions of silt in those areas where heavy loads are rendering multiple uses of the river impossible. A case in point would be the Hunting Creek estuary of the Potomac in Alexandria, where sediment, combined with sewage from the Alexandria Treatment Plant, is turning the area into a noxious swamp. This little estuary located near heavy concentrations of people would be a boon if properly cleaned and maintained. Thus far, no one has seen fit to accept responsibility for silt removal there and a landfill has been proposed as the "solution". Hunting Creek is becoming a classic example of the loss of public rights in the water resources of the Nation by default and attrition.

7. Finally, Mr. Chairman, the League is becoming convinced that our program of water quality standards is being interpreted as the "maximum" which should

be done in pollution abatement and prevention. When League members and other citizens worked for establishment of the program, it was our hope that the standards would serve as a minimum requirement to protect and enhance the quality of our waters. Through adequate enforcement procedures, we believe the standards could still be made to work as we had hoped. Perhaps the time has come for an administratively determined Federal presumption that water quality standards are in fact being violated whenever an effluent, at the point of discharge, is less in quality than the standards of uses determined for the receiving waters.

Mr. Chairman, we appreciate the opportunity to comment at what we hope will be a turning point for the Potomac River. Other League members are with me today but at this point I would ask that a statement by Mrs. C. B. Harris, of our Clean Water Committee in Virginia, be placed in the record. Thank you.

MR. STEIN: Without objection, that will be done.

Thank you for a very comprehensive and excellent statement, Mr. Pankowski.

MR. PANKOWSKI: Thank you.

MR. STEIN: Are there any comments or questions by the Conferees?

(No response)

(The following document was submitted by Mr. Pankowski for inclusion in the record:)

THE IZAAK WALTON LEAGUE OF AMERICA

308 Kerfoot Avenue
Front Royal, Virginia 22630

POTOMAC RIVER ENFORCEMENT CONFERENCE

Washington, D. C.

April 2-4, 1969

Mr. Chairman and Officials:

My name is Mrs. Gladys L. Harris. I am truly grateful for the opportunity to present comments to you as a member of the Clean Waters Committee of the Virginia Division and the National Izaak Walton League of America, an organization which has been concerned with the ecology of our outdoors for the past forty-eight years.

Our philosophy includes the tenet that clean waters should be kept clean and that no natural resource should be raped so as to preclude its continued and normal use by citizens or segments of our civilization, now and in future generations.

Rather than point out inconsistencies in the Virginia standards or expound on why we feel they should be more stringent, in order to allow a "cushion of safety" or retain the proverbial ounce of prevention, I would like to ask your earnest consideration of four areas affecting pollution not now included in the present standards--in Virginia at least.

These conditions will occur most frequently in the headwaters or on tributaries, but can be decisive factors in the condition of the Potomac River.

First is thermal pollution. Not knowing the final form or enactment of Senate Bill No. 7, some careful consideration should be given to required recirculation of water used as a coolant if the plant is located on a flowing stream. The reason for this is very simple. If excessive heat destroys plankton, the prime but minute basis for aquatic life, the less destroyed, the less opportunity there would be for destruction of waterlife in quantity.

Next is siltation and runoff. From your report of 1969 on Water Quality, you are aware of the serious inroads already made by siltation on the

Potomac. Surely siltation in the streams feeding the Potomac can become a contributing factor in the problem. The more concrete and brick used to cover absorbing soils, the greater the danger of lowering our watertable and thus creating lower flows during summer months. Simply put, if we don't retain as much rainfall as possible, there will be less water to diffuse the amount of pollutants now permitted. Runoff waters need to be returned through the soil.

Use of highly toxic insecticides and pesticides are in themselves pollutants. Aprime example is 2-4-D used to kill weeds on rights-of-way of some railraods. Concentrated quantities of these highly poisonous chemicals are easily carried off by rains, damaging growing crops and killing fishlife when they reach even the smallest streams. A level of lethality needs to be established and then criteria for use set.

Within the past ten years, with improved methods of crop cultivation, use of water for irrigation purposes is on the increase. When the river flow is at its lowest, when our waters are experiencing their heaviest demands, excessive irrigation very conceivably can cause the greatest damage. Some guidelines for raparian rights need to be established before devasting damage is done.

Perhaps I have oversimplified these four contributing factors to our pollution problems. But let us stop one minute and reflect. We now have the hindsight of how civilization can collectively endanger our actual life-surviving resources. We know the pain and expense involved in trying to correct our acts of greed or unconcern.

Let us profit by this knowledge and look toward prevention of yet other factors of pollution while we struggle to correct the damage already done.

Today we have that opportunity--tomorrow we may not.

Thank you for the opportunity to present these comments.

* * *

MR. STEIN: We do have a report from our Chesapeake Bay Laboratory on the latest bacteriological data that Secretary Klein asked for yesterday.

Without objection, this will be put into the record and copies will be made for the conferees.

(The above-mentioned document follows:)

BACTERIOLOGICAL SURVEY
POTOMAC ESTUARY
March 24 - April 4, 1969
CHESAPEAKE TECHNICAL SUPPORT LABORATORY

Date Sample Taken	Time Sample Taken	Water Temp °C	Secchi Disk Inches	pH	DO mg/1	Coliform MPN/100 ml	Fecal Coliform MPN/100 ml	Fecal Streptococci MPN/100 ml	Preliminary Salmonella MF Water Sample Volume	Preliminary Salmonella MF Water Sample Recovery	Preliminary Salmonella Swab Recovery
						Cabin John Bridge					
3-24	1115	10.2				490	20	< 20	450ml	-	
3-25	0930	11				1,720	210	< 20	450ml	-	
3-26	0945	10		7.55	11.65	5,420	490	20	200ml	-	
3-27	0920	7				9,180	940	40	200ml	-	-
3-28	0915	6.5				16,090	490	130	200ml	+ ?	
3-29	1410	9				5,420	1,300	20	200ml	-	
3-30	0935	7									
						Key Bridge					
3-24	1450	10.5				13,000	500	200	450ml	-	+ ?
3-25	1210	11		6.6		2,600	400	< 200			
3-26	1040	11	28		10.97	500	< 200	400			
3-28	1615					13,000	2,300	500			
3-29	1030	8.5	6			17,200	1,700	500			
3-30	1015	8.5	12								
						Rock Creek - M Street Bridge					
3-25	1005	10.5				348,000	240,000	4,000	150ml	+ ?	
3-26	1015	9		6.7	10.15	17,000	2,000	5,000			
3-27	0920	6.5				4,000	< 2,000	< 2,000	150ml	-	
3-28	0940	5				< 2,000	< 2,000	< 2,000	150ml	-	
3-29	1335	11				LA	LA	LA			
3-30	1000	7.5									

LA Laboratory accident

Date Sample Taken	Time Sample Taken	Water Temp °C	Secchi Disk Inches	pH	DO mg/l	Coliform MPN/100 ml	Fecal Coliform MPN/100 ml	Fecal St[illegible]tococci M[illegible]100 ml	Preliminary Salmonella		
									[illegible]F Water Sample		Swab
									Volume	Recovery	Recovery
						Tidal Basin					
3-24	1200	6									
3-25	1030	10				500	< 200	< 200			
3-26	1030	10				< 200	< 200	< 200			
3-27	1000	9.5		7.8	11.02	5,420	1,720	220			
3-28	0955	9				490	330	40			
3-29	1320	10				1,700	500	< 200	150ml	-	
3-30	1015	7				3,480	1,090	50			
						14th Street Bridge					
3-24	1345	11									
3-25	1150	11				800	< 200	< 200			?
3-26	1050	10.5	30	6.7		4,600	1,300	200	150ml	-	
3-28	1635	8.5			10.41	800	200	< 200	200ml	+	
3-29	1040	8.5	6			13,000	1,300	< 200			
3-30	1035	8.5	12			4,900	700	< 200	150ml	-	
						Haines Point, Buoy 2					
3-24	1330	10.5									
3-25	1145	11				200	< 200	200	450ml	+	
3-26	1100	10.5	25	6.4		160,900	4,900	200	150ml	-	
3-28	1650	8.5			10.27	1,300	< 200	200	200ml	-	
3-29	1050	9	6			54,200	2,200	< 200			
3-30	1050	8.5	12			2,600	1,300	< 200	150ml	-	
						Anacostia River - Sousa Bridge					
3-24	1315	11									
3-25	1120	12				2,000	< 2,000	< 2,000			-
3-26	1115	11.5	8	6.4		109,000	11,000	2,000	150ml	+	
3-28	1655	11.5			7.66	23,000	23,000	4,000	200ml	+	
3-29	1103	11.5	6			23,000	5,000	< 2,000			
3-30	1110	11	6			< 2,000	< 2,000	< 2,000	150ml	-	

Date Sample Taken	Time Sample Taken	Water Temp °C	Secchi Disk Inches	pH	DO mg/1	Coliform MPN/100 ml	Fecal Coliform MPN/100 ml	Fecal Streptococci MPN/100 ml	Preliminary Salmonella MF Water Sample Volume	Preliminary Salmonella MF Water Sample Recovery	Preliminary Salmonella Swab Recovery
						Bolling Air Force Base, Buoy 9					
3-24	1245	10.5				160,900	LA	1,700	450ml	-	-
3-25	1045	10.5		6.8		34,800	7,900	2,300	150ml	-	
3-26	1120	10.5	27		10.39	7,900	< 200	< 200	200ml	-	
3-28						24,000	1,300	< 200	150ml	-	
3-29	1130	9.	8			10,900	900	< 200			
3-30	1130	8.5	11								
						Woodrow Wilson Bridge					
3-24	1230	10.5				160,900	24,000	1,300	450ml	+	-
3-25	1030	11		6.7		> 160,900	54,200	3,300	150ml	+	
3-26	1130	10.5	24		9.10	918,000	33,000	< 2,000	200ml	+	
3-28						24,000	1,100	200	150ml	-	
3-29	1140	9.	8			2,000	< 2,000	< 2,000			
3-30	1205	8.5	11								
						Broad Creek, Buoy 86					
3-24	1150	10.2				3,300	800	< 200	450ml	+	-
3-25	1015	11		6.6		34,800	4,900	800	150ml	+	
3-26	1140	10.5	31		8.85	160,900	13,000	3,300	200ml	-	
3-28						22,100	1,300	< 200	150ml	-	
3-29	1158	8.5	12			4,900	500	< 200			
3-30	1215	9	11								
						Piscataway Creek, Buoy 75					
3-24	1630	10.3				3,300	500	< 200	450ml	+	-
3-25	0945	12.5		6.6		4,600	400	< 200	150ml	-	
3-26	1215	10.5	27		8.85	54,200	2,300	400	200ml	-	
3-28						10,900	2,600	< 200	150ml		
3-29	1218	9	12			10,900	1,700	< 200			
3-30	1225	9	12								

LA Laboratory accident

Date Sample Taken	Time Sample Taken	Water Temp °C	Secchi Disk Inches	pH	DO mg/1	Coliform MPN/100 ml	Fecal Coliform MPN/100 ml	Fecal Streptococci MPN/100 ml	Preliminary Salmonella		
									MF Water Sample		Swab Recovery
									Volume	Recovery	
						Dogue Creek, Buoy 67					
3-24	1200	8.5	22	7.55							
3-25	1200	9.5	20			400	< 200	< 200			-
3-26	1225	10	23		10.11	800	< 200	< 200			
3-28	1055	9.5	18			9,180	230	< 20	200ml	-	
3-29	1330					17,200	900	< 200	150ml	+ ?	
3-30	0950	8.5				16,090	2,210	< 20	150ml		
						Hallowing Point, Buoy 61					
3-24	1218	9	18	8.2							
3-25	1235	10	15			< 200	< 200	< 200			- ?
3-26	1235	9	12		11.90	800	< 200	< 200			
3-28	1041	9.5	24			140	< 20	20	200ml	-	
3-29	1300					34,800	3,300	< 200	200ml	-	
3-30	1020	9				1,090	230	< 20	200ml		
						Indian Head, Buoy 54					
3-24	1230	9	20	7.8							
3-25	1220	9	18			< 200	< 200	< 200			+ ?
3-26	1250	9	18		12.96	< 200	< 200	< 200			
3-28	1024	9.5	24			170	20	20	200ml	-	
3-29	1245					34,800	7,000	< 200	200ml	-	
3-30	1105	9				3,480	1,300	< 20	150ml	-	
						Possum Point, Buoy 44					
3-24	1257	8	24	8.25							
3-25	1207	9	22			< 200	< 200	< 200			-
3-26	1355	8	22		12.74	< 200	< 200	< 200			
3-28	1005	8.5	18			130	20	< 20			
3-29	1205					700	200	< 200			
3-30	1130	8.5				110	< 20	20			

Date Sample Taken	Time Sample Taken	Water Temp °C	Secchi Disk Inches	pH	DO mg/1	Coliform MPN/100 ml	Fecal Coliform MPN/100 ml	Fecal Streptococci MPN/100 ml	Preliminary Salmonella		
									MF Water Sample Volume	MF Water Sample Recovery	Swab Recovery
						Smith Point, Buoy 30					
3-24	1328	8	62	7.6							
3-25	1143	9	52			< 20	< 20	< 20			-
3-26	1430	8			11.54	< 20	< 20	< 20			
3-28	0943	8	24			50	< 20	< 20			
3-29	1120					40	< 20	< 20			
3-30	1145					20	< 20	< 20			
						Maryland Point, Buoy 19					
3-24	1350	8	49	7.3							
3-25	1125	8	64			< 20	< 20	< 20			-
3-26	1458	8	45		12.14	< 20	< 20	< 20			
3-28	0925	7.5	36			< 20	< 20	< 20	200ml	-	
3-29	1050	9				20	< 20	< 20	200ml	-	
3-30	1220	8				20	< 20	< 20	150ml	-	
						Nanjemoy Creek, Buoy 11					
3-24		8		7.2							
3-25	1105	7.5	58			20	< 20	< 20			-
3-26	1520	8	60		11.83	< 20	< 20	< 20			
3-28	0905	7.5	48			< 20	< 20	< 20			
3-29	1015	8				50	< 20	< 20			
3-30	1300	9				< 20	< 20	< 20			
						301 Potomac River Bridge					
3-24	1510	9	58	7.8							
3-25	1040	7.5	46			< 20	< 20	< 20			-
3-26	1600	7.5	52		11.83	20	< 20	< 20			
3-28	0838	7.5	72			< 20	< 20	< 20			
3-29	0930	8				20	< 20	< 20			
3-30	1345	8				< 20	< 20	< 20			

Date Sample Taken	Time Sample Taken	Water Temp °C	Secchi Disk Inches	pH	DO mg/1	Coliform MPN/100 ml	Fecal Coliform MPN/100 ml	Fecal Streptococci MPN/100 ml	Preliminary Salmonella		
									MF Water Sample		Swab
									Volume	Recovery	Recovery
						Lower Cedar Point, Buoy 33					
3-24		9	30	8.1		40	< 20	< 20			
3-25	1030	7.5	42			20	< 20	< 20			
3-26	1545	7.5	54		11.41	20	< 20	< 20			
3-28	0830	8	72			< 20	< 20	< 20			
3-29	0922	7.5				< 20	< 20	< 20			
3-30	1355	8									
						Piney Point					
3-24	1400	4				20	< 20	< 20			
3-25	1310	12				20	< 20	< 20	150ml		
3-26	1235	7		7.4	10.76	< 20	< 20	< 20	200ml	-	
3-27	1200	6.5				< 20	< 20	< 20		-	
3-28	1155	8				< 20	< 20	< 20			
3-29	1030	7				< 20	< 20	< 20			
3-30	1230	8									

MR. STEIN: At this point, we will stand adjourned for lunch, and we will reconvene promptly at 1:30.

(Whereupon, a luncheon recess was taken.)

* * *

AFTERNOON SESSION

1:30 p.m.

MR. STEIN: May we reconvene?

Is Mr. Sims of the Izaak Walton League present?

(No response)

MR. STEIN: Mr. Sims is not here.

Is Mr. Minney of the Izaak Walton League present?

(No response)

MR. STEIN: This is the second time we have called Mr. Minney. Mr. Minney is not here.

We will call on Maryland, Mr. McKewen.

STATEMENT OF
MR. THOMAS D. McKEWEN
CONFEREE AND DIRECTOR
BUREAU OF RESOURCES PROTECTION
MARYLAND STATE DEPARTMENT OF HEALTH

MR. McKEWEN: Thank you, Mr. Chairman.

I am Thomas D. McKewen, Director of the Bureau of Resources Protection, Maryland State Department of Health.

I will explain at the outset that there are two Maryland agencies which have major responsibility in the field of water pollution control.

I will describe the program of the Health Department, which deals primarily with the control of municipal wastes and the prevention of pollution caused by them. I will then be followed by Mr. Paul McKee, Director of the Department of Water Resources, whose statement will deal with industrial wastes and with water quality standards.

One of the Health Department's responsibilities is the control of sewage, solid wastes, and air emissions.

Although the principal concern of this

Conference is water pollution, it is important to recognize that this is only one aspect and not an independent one of environmental pollution. It is also important to recognize that problems and actions in one particular region of the Potomac Basin cannot be evaluated in isolation. Therefore, in order that my remarks on the subject of this Conference may be presented in their proper context, I will briefly describe the relevant waste control activities conducted by the Health Department.

The design of the wastes control program is based on three simple observations:

1. Nature provides only three ultimate repositories for wastes--water, air and land.
2. The protection of each of these resources has its own distinct technology.
3. It is possible, but unwise, to protect any one of the three resources at the sacrifice of the other two.

Based on these observations, three separate groups of activities are carried out: air quality control, solid wastes, and water and sewerage. These three are coordinated, however, to prevent attempts to solve a problem by simply transferring it from one environmental medium to another. As a result, a proposed sanitary landfill, for example, is examined to assure that the operation will dispose of solid wastes in a safe, nuisance-free manner and also not cause the pollution of ground or surface water. Similarly, the installation of equipment to remove particulate matter from air emissions would be approved only if the accumulation of particulates was so handled that it would not be washed into a stream or littered onto the surface of the ground.

Since the sewage control activities are of principal interest at this time, I will discuss these in some detail. These activities are designed to provide basic services to individuals and population groups, to protect health and to prevent pollution. To accomplish these aims, five separate but coordinated types of activities are required:

1. Identification of existing and projection of future problems.
2. Analysis of individual and interconnected problems in order to develop and select from possible alternate solutions.

3. Construction of needed pollution abatement facilities or other measures indicated by the above analysis.
4. Effective operation of the facilities.
5. Monitoring and evaluation of all of these activities to be certain that they are achieving the desired result in an efficient manner.

Following is a brief sketch of the actions that are being taken to carry out each of these five steps:

1. In 1966, legislation was adopted which requires all counties to develop comprehensive wastewater plans by January 1, 1970. Thereafter, each plan will be reviewed at least annually and updated if necessary. As a result, Maryland will have, for the first time, a set of coordinating plans covering all areas of the State. By examining population characteristics, land use patterns, water quality data, and related information, each county is identifying existing sewerage and water pollution problems and developing the best available forecast of future problems. Each county plan will present a schedule for the construction of sewage treatment plants and other facilities to correct existing problems and to

prevent future ones. One of the key requirements is that the plans identify the new and improved facilities and actions that will be required to comply with the Water Quality Standards adopted by Maryland and approved by the Federal Government. Just as the Standards apply to all streams, both interstate and intrastate, so the plans must show the measures that will be taken to provide and sustain water quality that will meet, and where feasible, exceed the Standards in all surface waters of the State. The State Department of Health is contributing approximately one-half of the local cost of these plans and, with the assistance of the Department of Water Resources, provides technical guidance to each county and coordination between counties. One of the most important features of these plans is that they will not simply serve as guides, but will be action plans which must be implemented on a definite time schedule.

2. The county plans, as indicated above, will help select and develop alternate solutions. In addition, the river basin pollution control plans now being initiated by the Department of Water Resources will coordinate the individual county plans to assure that local needs will be met in compatibility with State and

regional water quality objectives.

3. The funding facility: Maryland was one of the first States to supplement Federal grants to aid in the construction of sewage treatment facilities. To date, bond issues totaling $176,295,000 have been authorized by the State for sewage treatment plant construction grants. Of this total, a $50 million issue was authorized in 1967 and a $100 million issue in 1968 indicating the accelerating pace of the grant program. It is doubtful that any State has exceeded and, in fact, few have approached the magnitude of Maryland's grant program on a per capita basis.

I would like at this point to provide some current information. Some sewers are now going into pollution abatement facilities in the State of Maryland.

Under Federal law, any pollution abatement project would be entitled to up to 55 per cent grants. The State also provides a 25 per cent outright grant.

However, due to the shortage of Federal funds, the State has been required, in order to carry out the schedule it likes, to not only put up a 25 per cent outlay grant, but also to make up the difference between the 55 per cent possible Federal grant and the actual

Federal grant that can be obtained with available Federal dollars, so that at the present time, instead of a 55-25-20 per cent funding, the local governments are required to pay 20 per cent, the State is putting up 73 to 74 per cent, and the Federal grant amounts to only six or seven per cent of the total.

With the aid of these grant funds, construction has been completed on 51 new sewage treatment plants for communities which had inadequate or no treatment facilities. Eight treatment plants which had been operating beyond their design capacity were eliminated by extending interceptor sewers from areas served by adequate facilities. Now under construction or scheduled for early construction are 22 new plants, two plant replacements, and the upgrading of 13 existing plants. A total of 242 grant applications have been received and include, in addition to the treatment facilities, sewage pumping stations, force mains, and interceptors to eliminate or prevent water pollution.

Largely as a result of the grant program, hopefully the backlog of sewage treatment needs which have developed over many generations will soon be eliminated. Present estimates are that by 1971 the treatment facilities required to meet the State's Water Quality Standards will be either in operation or funding will have been arranged for early construction. From that point on, we will be striving to keep ahead of demands caused by increasing population.

4. Operation: Too often there is a gap between expected performance of waste treatment plants and actual performance. To close this gap, legislation was enacted in 1967 to require that operators of waste treatment plants qualify for certification. To help the operators increase their competence and prepare for certification, training programs have been established at State expense at four strategically located junior colleges. In 1968, 198 operators took advantage of this opportunity. Over 230 operators applied for such training in 1969; however, financial limitations restricted registration to 191. This new operator training and certification program will lead to substantial improvement in the performance of waste treatment plants.

5. Finally, the last step, the monitoring and evaluation activities include sampling sewage treatment plants, periodic engineering evaluation of the physical and operational adequacy of the plants and

comparison of the impact on water quality of treated sewage discharges with the State's Water Quality Standards. These activities are coordinated with and supplemented by water quality measurements made by the Department of Water Resources. In effect, monitoring and evaluation are part of the problem identification activity listed as No. 1 above. The five steps then form a closed loop in which actions are planned, taken, measurements made of the response of the environment to the action, and the measured response compared with the anticipated response.

Several of these actions converge to a key checkpoint in 1971:

1. At all communities requiring sewerage services, high level waste treatment facilities will have been constructed or financing arranged for early construction.
2. More effective and reliable operation of treatment plants will have been achieved due to the mandatory certification act and training opportunities provided.
3. The first round of county comprehensive

water supply and sewerage plans will have been completed, reviewed,and implementation initiated.

4. Regional water pollution control plans will be well under way in critical basins of the State.

With this background, I will now address myself more specifically to the region that is the subject of this Conference. In this region major responsibility for the collection of sewage and its management to prevent pollution has been carried out by the Washington Suburban Sanitary Commission. Since the Commission will present a detailed statement on its activities shortly, I will comment on them only briefly.

The first essential step in the management of wastes is to provide effective collection and transportation facilities to deliver the wastes, without leakage, from their point of generation to adequate treatment facilities. Utilities have been hard pressed to keep pace with the rapid population growth of this region. At times, the pace was not rapid enough and overtaxed sewers and pumping stations spilled raw sewage into tributaries of the Potomac. Over the past decade, more than 20 major projects have been undertaken to eliminate such conditions.

Sewer reinforcements have corrected spillages in the Anacostia River, Rock Creek, Henson Creek, Sligo Branch, Oxon Run, Little Paint Branch, and others. Interceptors have replaced inadequate sewage treatment facilities at Rockville, Gaithersburg, and Greenbelt; and have eliminated unsatisfactory individual sewerage systems in the watersheds of Cabin John Creek, Watts Branch, James Creek, and Muddy Branch.

These facilities have prevented the proliferation of small sewage treatment plants scattered throughout the region.

Anticipated continued population growth will require continuing extension and reinforcument of sewage collection and transportation facilities. The State accepts as a major obligation the provision of assistance to local jurisdictions in carrying out such construction in a timely and effective manner. This obligation is being met now by the construction grant program described earlier.

Since there will always be some sparsely populated and isolated areas where a central sewerage system is neither feasible nor necessary, there is a further obligation to control the installation of individual septic tank systems both to provide satisfactory service to individual property owners and to prevent failures that would result in the pollution of tributary streams. This control is carried out through local health departments.

In the control of both centralized and individual sewerage systems, it is our intention that waste management support sound local and regional land use decisions rather than dictate land uses.

Once sewage has been collected and transported, adequate treatment to protect water quality must be provided. In this connection, the District of Columbia has provided an outstanding example of regional cooperation. Over 40 per cent of the load imposed on the District of Columbia Water Pollution Control Plant is generated in Maryland. This Plant is scheduled for very costly enlargement and improvement. In recognition of Maryland's obligation to share in this cost, the 1969 session of the General Assembly enacted legislation which will make some of these costs eligible for State grant support. It is estimated that the improvements necessary to accommodated Maryland residents will cost over $27 million during the next four years. This figure is based on the proposed enlargement and improvement as described by Mr. Norman Jackson and Dr. Clair Sawyer this morning. If the now proposed level of treatment is deemed to be inadequate, and higher and more costly levels of treatment must be achieved, then Maryland's share will no doubt rise proportionately. The State will guarantee that 80 per cent of this amount will be borne by the combination of State and Federal grants. If Federal grant funds continue at their present inadequate level, the State share may approach $20 million.

This use by Maryland residents of a District of Columbia facility is only one example of the regional cooperation that is a key to the provision of adequate service and sound environmental management. Another example is the Potomac River Interceptor Sewer. In order to make this Sewer available to Maryland residents, the Washington Suburban Sanitary Commission is required to pay over $5 million. Through special legislation enacted last year, half of this cost is being borne by a State grant.

As population growth spreads beyond the boundaries of the District of Columbia service areas, additional sewage treatment plants may be needed. Such plants will be designed with the protection of the Potomac River as a primary consideration. One such plant is now in operation at Piscataway. This plant was designed to provide a high level of waste cleansing even though its discharge constitutes only about one per cent of the organic load on this stretch of the Potomac River. The plant is scheduled for expansion in the near future to accommodate growing population. The enlarged plant will provide an even higher degree of treatment than that required to meet Water Quality Standards. However, a serious problem exists. The plant was designed to discharge directly to the Potomac River, but the Washington Suburban Sanitary Commission has been unable to secure authorization to construct an outfall sewer across National Park Service property as was intended and, it was believed, agreed to when the plant was constructed.

This problem has even greater significance than the penalties it has imposed in terms of water quality, public satisfaction and money. It has illustrated that effective water quality management will be achieved only to the extent that effective intergovernmental and regional cooperation is achieved.

For more than two decades public desire for clean water has been growing into a public demand. During the same period of time, the technology of waste cleansing has developed to the point that, for a price, virtually any desired level of water quality can be attained. This Conference provides an opportunity for all levels of government and individual citizens to participate in setting water quality goals and in agreeing upon actions to realize those goals.

The Potomac River has been called the Nation's River, but it is the people who live in the Potomac Basin who have the most to gain by wise management of the river and the most to lose by unwise management. They must bear the brunt of the costs of a successful pollution control effort and the brunt of the penalties of an unsuccessful effort. With all that is at stake and with all of the opportunities available, it is inconceivable that this effort should be allowed to fail. I am confident that all participants in this Conference share the determination that it shall not fail.

MR. STEIN: Thank you, Mr. McKewen.

Are there any comments or questions?

(No response)

MR. STEIN: If not, you may continue with the Maryland presentation.

MR. McKEWEN: We will now have Mr. Paul McKee, Director of the Department of Water Control.

STATEMENT OF

MR. PAUL W. McKEE

CONFEREE AND DIRECTOR

MARYLAND DEPARTMENT OF WATER RESOURCES

MR. McKEE: Mr. Chairman, fellow conferees, ladies and gentlemen:

My name is Paul McKee. I am the Director of the Maryland Department of Water Resources, and I would like to spend a few minutes discussing with you the area of concern, water quality standards applied to the area and the water quality conditions in this area as it applies only to Maryland.

I. AREA OF MARYLAND'S JURISDICTION

The area designated for consideration by this conference includes the following Maryland waters:

A. The Potomac River main stem, encompassing that portion of the stream lying between Little Falls and the Northwest boundary line of the District of Columbia;

B. The Potomac River Estuary, encompassing that portion of the tidal stream lying between the Southeast boundary line of the District of Columbia and Hallowing Point; and

C. All tributaries and portions of tributaries lying in the State of Maryland that flow directly, or indirectly, into the Potomac River between Little Falls and Hallowing Point.

II. GENERAL DESCRIPTION OF AREA

A. Potomac River - Upstream from Northwest D.C. Boundary Line.

Although the State of Maryland has established Little Falls as the boundary of tidal and nontidal waters for the Potomac River, the River--in point of fact--it is free flowing and nontidal from the Northwest Boundary line of the District of Columbia upstream to Little Falls. Approximately one (1) mile of the Main Stem--Potomac is located within these confines. The Maryland shoreline is rugged in terrain with little or no direct surface drainage. Other than discharges to Little Falls Branch, which is confluent with the Potomac River at the upstream limit of the enforcement area, there are no industrial wastewater discharges to these waters.

B. Potomac River Estuary--Downstream from Southeast D.C.

Boundary Line.

The Potomac River Estuary is tidal from the Maryland--District of Columbia line to Hallowing Point, a distance of approximately fourteen miles. Due to several embayments, this portion of the River is characterized by wide cross sections and slow-moving tidal currents. The Maryland side of the River is bordered by residential development, recreational park area, farms and undeveloped forested lands.

The shore line of this section is continually eroding due to the type of unconsolidated soils and poor vegetative cover. The River is used for commercial navigation and for water oriented recreation.

C. All Tributaries and Portions of Tributaries Lying in the State of Maryland.

1. Little Falls Branch contains approximately six square miles of drainage area through the urban area of Bethesda. Although the area is sewered, the stream receives discharges from storm sewers and carries sediments and other materials resulting from urban runoff.

2. Rock Creek flows southeasterly for a distance of

approximately twenty miles across the eastern third of Montgomery County prior to entering the District of Columbia. The northern half of the drainage basin is largely rural. The southern half, extending downstream from the Rockville area is heavily urbanized. The immediate area bordering both sides of the Creek have been reserved for parkland. The area is sewered, however, the stream receives the discharges from sewer overflows and storm drains as well as sediments and storm water runoff.

3. Northwest Branch of the Anacostia River originates in the Norwood area of Montgomery County and flows in a southeasterly direction for sixteen and-a-half miles draining a part of the County's agriculture and suburban residential area. Northwest Branch has its confluence with the Northeast Branch at Bladensburg and the two Branches constitute the main stem of the Anacostia River, two and-a-half miles above the D.C. line.

4. Northeast Branch of the Anacostia River is formed at College Park by the confluence of Paint Branch and Indian Creek. Paint Branch and Little Paint

Branch originate in Montgomery County and flow through areas that have been extensively mined for sand and gravel. Indian Creek originates in the vicinity of Laurel and flows for seven miles through suburban, residential, agriculture and industrial developed areas prior to joinint Paint Branch.

5. Anacostia River from the confluence of the Northwest Branch and Northeast Branch flows through an area of two and-a-half miles that has recreational facilities bordered by suburban, commercial, and industrial facilities. Due to a previous history of flooding, extensive flood control measures have been constructed in this area of the River.

6. Oxon Run originates in the District Heights area of Prince George's County and flows approximately four and one-half miles in Maryland before entering the District of Columbia. It then flows for three miles through the District of Columbia and again enters Maryland for approximately one mile before its confluence with the Potomac Estuary. The Run flows through residential developed areas which have highly erodible soils

resulting in sediments in the stream bed.

7. Henson Creek originates in Andrews Air Force Base and the Forrestville area. Extensive mining for sand and gravel has been conducted for many years in the basin. The steep open slopes and easily erodible soils result in sediments carried by the stream. This area is rapidly becoming highly developed for residential and commercial uses.

8. Broad Creek receives the flow from Henson Creek and within a mile and-a-half joins the Potomac Estuary below Fort Foote.

9. Swan Creek drains the Hedge Neck area and joins the Estuary at Hatton Point. At present there is very little land development in the area and no known discharges. However, extensive residential development is expected in the near future and preventive measures for the control of sediment will be needed to protect this creek.

10. Piscataway Creek and tributaries also originate on Andrews Air Force Base and flow for sixteen miles to the Estuary. In the area of the headwaters of Piscataway and Tinkers Creeks sand and gravel have been mined extensively, permitting

erosion of the open slopes. In recent years the basin area has rapidly changed to suburban residential.

11. Pomonkey Creek originates in the southwest portion of Prince George's County and flows for approximately four miles through undeveloped areas in the north end of Charles County.

III. DESIGNATED WATER USES AND WATER QUALITY STANDARDS FOR THESE STREAMS

A. Potomac River Main Stem, Little Falls to D.C. Line.

Maryland Water Quality Standards establishes Water Use Group B, public or municipal water supply in that portion of the Potomac River Main Stem (Maryland portion) upstream fromthe Northwest boundary line of the District of Columbia.

B. Potomac River--Estuarine, D.C. Line to Hallowing Point.

Maryland Water Quality standards establishes Water Use Group C, water contact recreation, propagation of fish, other aquatic life and wildlife, and industrial water supply.

C. Tributaries to Potomac River and Portion of Tributaries Lying in Maryland.

Maryland Water Quality Standards establishes Water Use Group C, water contact recreation, propagation of fish and wildlife, agriculture water supply and industrial water supply, for all of the tributaries described except for those small portions of Rock Creek in Maryland designated as Trout waters and requiring a higher Dissolved Oxygen content. Table I of my document shows the specific Water Quality Standards for waters in the Metropolitan Washington area.

IV. EXISTING WATER QUALITY CONDITIONS

In 1967, a water quality surveillance network was established throughout the State.

In 1968, a preliminary examination of all surveillance stations was initiated and in March 1969, selected surveillance stations pertinent to the Washington Metropolitan area were reexamined. These surveys were made during springtime and do not reflect critical water quality conditions which would be expected to occur in late summer low flow periods. However, even in these circumstances, the bacterial data shows that every station, except those in the upper reaches of Piscataway Creek and the Potomac Estuary at Marshall Hall exceeds the numerical "signal value" described in the attached

Table IV and necessitates a detailed sanitary survey by Maryland. Such additional sanitary surveys are now in the planning stage. (The data from these surveys are also presented in the document in Table II.)

Potomac Estuary

The Department of Water Resources has maintained close liaison and cooperation, including the provisions of some field and laboratory support, to the Federal Water Pollution Control Administration, Middle Atlantic Region, in their investigations of water quality problems in the Potomac Estuary. In view of the intensive nature of the studies conducted on the Potomac in 1968 by the Chesapeake Technical Support Laboratory of the Federal Water Pollution Control Administration, the State has limited the survey activity on the Estuary to the newly developed State-wide surveillance program.

The Federal Water Pollution Control Administration data, presented at this conference, clearly indicates continuing violation of Maryland Water Quality Standards for fecal coliform and dissolved oxygen. Without being unmindful of waste sources within the State of Maryland, it is clearly evident that the source for this degraded condition originates outside of the Maryland boundaries.

V. STATUS OF WASTEWATER DISCHARGES

Twenty-three industrial sources are discharging into the Potomac River tributaries in the Maryland area.

Two sources, Andrews Air Force Base at Camp Springs and Mineral Pigments Corporation at Muirkirk, are shown as continuous and recurrent violations which require additional action by the Maryland Department of Water Resources.

Four sources, Devlin Lumber and Supply Company at Rockville, Metropolitan Fuels Company at Bethesda, Washington Petroleum Products Company at Bethesda and the Potomac Sand and Gravel Corporation at Greenway Flats, need to upgrade existing treatment facilities which were previously satisfactory, but now do not meet the more stringent requirements of Water Quality Standards. Time schedules have been established by Maryland for these sources to provide the necessary improvements. This information is presented in Table III.

As previously discussed, much of the soils in the area are easily erodible and the high level of construction in the area has resulted in discharges of silt to the streams. The Attorney General of Maryland released an opinion that stated silt is a pollutant as defined in the Water Resources Law and as such is subject to the control of the Maryland Department of Water Resources.

The Department of Water Resources is presently developing a comprehensive Sediment Control Program, which will include sediment control regulations to be applied to all public agencies as well as private industry or individuals.

Within this program, each County will be the primary unit of government in developing, administering and enforcing the control programs. However, the Department of Water Resources will:

1. Endorse and back up enforcement of County sediment control programs.
2. Assist any County, not having a sediment control program, in the development of a program.
3. Enforce its sediment control regulations in Counties not having or enforcing a sediment control program.

In 1967, the Montgomery County Council amended the subdivision regulations of 1965 incorporating mandatory sediment control measures. County Public Works inspectors check for compliance before approving and releasing street grading and paving permits. A grading Ordinance is in the discussion stage.

In 1966, Prince George's County adopted a Sediment Control Program which is being implemented on a voluntary basis by subdivision developers. A proposed supplement to the Building Code, Article 21, covering the areas of grading, sediment control and flood plain development is presently under consideration by the County officials, but no date has yet been set for a Public Hearing.

The industrial waste conditions described represent the present status of the Maryland Department of Water Resources enforcement effort to control water pollution from industrial sources. This effort is an ongoing process and therefore, the status of the industries reported, and others not specifically referred to in this report, are subject to changes. The Department will deal effectively and promptly with any existing or potential water pollution conditions observed.

VI. ADDITIONAL MARYLAND LEGISLATION

To help accomplish the objectives in meeting the Water Quality Standards of the State, the Maryland Legislature, in the recent 1969 session, passed several important acts:

1. Establishing a procedure whereby the Water Resources Commission can recommend to the Attorney General that suit be brought against persons liable for damages to aquatic resources when such damages are identified and assessed by the Maryland Department of Game and Inland Fish and the Maryland Department of Chesapeake Bay Affairs.
2. Provided for the licensing of persons engaged in the collecting and disposing of waste oil or other petroleum products and establishes procedures whereby the Department can be assured that the collected matter will be disposed of in an approved manner.
3. Increased the penalties for violations of the Department's rules, regulations, or

orders to a maximum fine of $10,000 and imprisonment not to exceed one year.

These acts, along with far-reaching legislation for funding and planning sewerage facilities previously enacted, will assure that Maryland is able to meet her share of the obligation in improving the water quality of the Potomac River and its tributaries.

VII. MARYLAND RECOMMENDATIONS

To meet Federal and State standards and to enhance water quality in the Maryland portion of the Potomac River and its tributaries in the Washington, D.C. area, the Maryland Department of Water Resources recommends that:

1. Waste treatment and disposal facilities be provided and maintained to ensure compliance with water quality standards.
2. Phosphorus reduction facilities be provided for all wastes discharged to the Potomac Estuary.
3. Immediate Action be taken to eliminate the pollution entering Rock Creek and the Anacostia River upstream from the Maryland-District of Columbia line.

4. Existing local, municipal, county, state, interstate, and Federal agencies involved in erosion and silt control unite in an expanded, coordinated effort to implement an accelerated silt control program for the Potomac River Basin including the Anacostia River and Rock Creek.

5. A systematic program be developed and conducted to prevent the disposal of trash, debris, junk, and other objectionable material adjacent to and into waterways.

* * *

TABLE I
SPECIFIC WATER QUALITY STANDARDS FOR WATERS IN METROPOLITAN WASHINGTON AREA

ITEM NO.	WATER	ZONE	STANDARDS FOR WATER USES INDICATED	WATER USES TO BE PROTECTED
81	Little Falls Branch & tributaries	Headwaters to Potomac River	Group C	III,IV,V
83	Potomac River	Main Stem in Montgomery County	B	II,III,IV,V,VI
84	Rock Creek & tribs.	Headwaters downstream to Detention Dam #5	C	III,IV,V
85	Rock Creek & tribs.	From Norbeck Rd. (Rt. #28) upstream to Detention Reservoir #5 at Dam	C	III,IV(Trout),V
86	Rock Creek & tribs.	Upstream of Dam #1	C	III,IV(Trout),V
87	Rock Creek & tribs.	Downstream from Norbeck Rd. (Rt. #28) to D. C. Line	C	III,IV
88	Northeast Br. & tribs.	Headwaters to U. S. Rt. #50	C	III,IV,V,VI
89	Paint Branch & tribs.	Headwaters to confluence with Northeast Branch	C	III,IV,V,VI
90	Northwest Branch & tributaries	Headwaters to confluence with Anacostia River	C	III,IV
91	Anacostia River	From confluence of Northeast & Northwest Branch to D. C. Line	C	III,IV,VI
92	Oxon Run & tribs.	Maryland Sections to mouth	C	III,IV
93	Potomac River - Main Stem	D. C. Line to Hallowing Point	C	III,IV,VI
94	Henson Creek & tribs.	Headwaters to mouth	C	III,IV,VI
95	Broad Creek	Headwaters to mouth	C	III,IV

TABLE I
SPECIFIC WATER QUALITY STANDARDS FOR WATERS IN METROPOLITAN WASHINGTON AREA

ITEM NO.	WATER	ZONE	STANDARDS FOR WATER USES INDICATED	WATER USES TO BE PROTECTED
96	Swan Creek - trib. of Potomac River	Headwaters to mouth	Group C	III,IV
97	Piscataway Creek & tribs.	Headwaters to Md. Rt. #224	C	III,IV,V,VI
98	Piscataway Creek - trib. of Potomac River	From Rt. #224 to mouth	C	III,IV
112	Pomonkey Creek & tribs.	Headwaters to Md. Rt. #226	C	III,IV
113	Pomonkey Creek	Md. Rt. #226 to mouth	C	III,IV

TABLE II
STATE OF MARYLAND
DEPARTMENT OF WATER RESOURCES
WATER QUALITY INVESTIGATION DIVISION

Maryland Water Quality Stations
Potomac River and Tributaries
Little Falls - Hallowing Point

County and Station Number	Date	Maryland Coordinates	Location	pH	Temp. °F	D.O. ppm	Coliform MPN/100 ml	*E. coli* MPN/100 ml	Water Use Group and Uses
Montgomery									
M13	5-13-68	405 -767	Little Falls Branch	7.8	60.8	7.7	240,000	930**	C (III, IV)
	3-25-69		Just above Dalcarlia Reservoir	7.9	55.0	7.7	430,000	2,300**	
M14	5-13-68	406 -764	Potomac River	8.1	68.0	7.1	750	23	B (II, III, IV, V, VI)
	3-25-69		Dalcarlia Intake	8.3	53.0	11.4	43,000*	150	
M15	5-13-68	443.8-805.8	Paint Branch	7.6	57.0	10.0	430	43	C (III, IV, V, VI)
	3-25-69		Columbia Pike, Md. #29	7.4	51.0	10.1	23,000	2,100**	
M16	5-13-68	435.8-798.2	Northwest Branch	7.6	60.8	9.1	4,300	230	C (III, IV)
	3-25-69		Columbia Pike, Md. #29	7.2	51.0	10.5	43,000	930**	
M23	5-14-68	474.8-763.2	Rock Creek	7.7	57.2	9.9	2,300	2,300**	C (III, IV, V)
	3-25-69		Bridge on Md. #115, tributary to Lake #5	7.3	52.0	10.5	93,000	7,500**	
M24	5-14-68	468.5-771	North Branch Rock Creek	7.5	57.2	9.3	3,900	230	C (III, IV (Trout), V)
	3-25-69		Bridge on Md. #115, tributary to Lake #1	7.4	52.0	10.6	150,000	210	
M25	5-14-68	457.5-767.2	Rock Creek	7.5	57.2	9.7	2,300	43	C (III, IV)
	3-25-69		Bridge, Rockville Road, Md. #28	7.9	52.0	11.0	93,000	210	

* Does not meet Standards
** Indicates need for sanitary survey

TABLE II
STATE OF MARYLAND
DEPARTMENT OF WATER RESOURCES
WATER QUALITY INVESTIGATION DIVISION

Maryland Water Quality Stations
Potomac River and Tributaries
Little Falls - Hallowing Point

County and Station Number	Date	Maryland Coordinates	Location	pH	Temp. °F	D.O. ppm	Coliform MPN/100 ml	*E. coli* MPN/100 ml	Water Use Group and Uses
Montgomery									
M26	5-13-68	420 -785	Rock Creek	7.7	60.8	8.3	46,000	430**	C (III, IV)
	3-25-69		Maryland-D. C. line at north end Rock Creek Park	7.5	52.0	8.4	230,000	2,300**	
Prince George's									
PG 1	5-21-68	401.5-816.2	Anacostia River	7.3	59.9	9.9	46,000	4,300**	C (III, IV)
	3-25-69		Md. Route #202 crossing Anacostia River	6.6	54.0	9.7	23,000	290**	
PG 2	5-21-68	373.3-814.7	Oxon Run and tributaries	7.3	59.0	9.6	4,300	430**	C (III, IV)
	3-25-69		Md. Route #218 crossing Oxon Creek	7.1	51.0	9.4	43,000	210	
PG 3	5-21-68	355.5-797.6	Oxon Run and tributaries	8.2	68.9	9.9	46,000	1,500**	C (III, IV)
	3-25-69		Oxon Creek just west of Forest Heights, 0.5 miles upstream from mouth	7.4	53.0	10.3	93,000	1,500**	
PG 4	5-21-68	349.2-791.1	Potomac River	8.2	67.1	7.8	>240,000	>240,000**	C (III, IV, VI)
	3-25-69		Potomac River Mid-channel, Woodrow Wilson Bridge	8.2	50.0	9.7	43,000	23,000**	

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TABLE II
STATE OF MARYLAND
DEPARTMENT OF WATER RESOURCES
WATER QUALITY INVESTIGATION DIVISION

Maryland Water Quality Stations
Potomac River and Tributaries
Little Falls - Hallowing Point

County and Station Number	Date	Maryland Coordinates	Location	pH	Temp. °F	D.O. ppm	Coliform MPN/100 ml	E. coli MPN/100 ml	Water Use Group and Uses
Prince George's									
PG 5	6- 4-68	334.7-789.9	Potomac River	7.8	67.1	8.1	46,000	9,300**	C (III, IV, VI)
	3-25-69		Potomac River Mid-channel at Red Nun Buoy #86 off mouth of Broad Creek	8.2	52.0	10.4	15,000	930**	
PG 6	6- 4-68	317.4-785.7	Potomac River	7.8	68.9	7.8	4,300	930**	C (III, IV, VI)
	3-25-69		"Fl" buoy #22 off mouth of Piscataway Creek	8.4	51.0	12.2	2,300	43	
PG 7	5-21-68	339.7-801.1	Henson Creek and tributaries	8.1	59.9	9.1	46,000	430**	C (III, IV, VI)
	3-25-69		Md. Route #210 crossing Henson Creek	7.3	50.0	10.4	230,000	430**	
PG 8	5-21-68	337 -799.3	Broad Creek	8.1	60.8	9.1	110,000	4,300**	C (III, IV, VI)
	3-25-69		Livingston Road crossing Broad Creek	7.3	51.0	10.2	93,000	290**	
PG 9	6- 4-68	322.2-791.3	Swan Creek	7.8	67.1	8.1	46,000	15,000**	C (III, IV)
	3-25-69		Just upstream from mouth at end of unnamed road south of Riverview	8.2	51.5	11.2	23,000	290**	

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TABLE II
STATE OF MARYLAND
DEPARTMENT OF WATER RESOURCES
WATER QUALITY INVESTIGATION DIVISION

Maryland Water Quality Stations
Potomac River and Tributaries
Little Falls - Hallowing Point

County and Station Number	Date	Maryland Coordinates	Location	pH	Temp. °F	D.O. ppm	Coliform MPN/100 ml	*E. coli* MPN/100 ml	Water Use Group and Uses
Prince George's									
PG10	5-21-68	346.5-844.4	Piscataway Creek and tributaries Md. Route #223 crossing Piscataway Creek	7.1	57.2	7.0	110,000	93	C (III, IV, V, VI)
	3-25-69			7.3	52.0	9.0	23,000	75	
PG11	5-21-68	326.6-833.6	Piscataway Creek and tributaries Md. Route #5 crossing Piscataway Creek	7.3	56.9	8.8	24,000	93	C (III, IV, V, VI)
	3-25-69			7.4	51.0	9.9	43,000	930**	
PG12	5-21-68	315.0-803.8	Piscataway Creek Md. Route #210 crossing Piscataway Creek	7.5	56.9	9.1	24,000	24,000**	C (III, IV)
	3-25-69			7.3	49.5	10.0	43,000	4,300**	
PG13	5-21-68	316.4-792.9	Piscataway Creek Piscataway Creek at pier of Prince George's County Yacht Club	8.6*	66.2	10.1	9,300	930**	C (III, IV)
	3-25-69			7.3	51.0	13.2	9,300	43	
Charles									
CH 1	5-13-68	310.7-771.1	Potomac River End of oil line pier downstream from Marshall Hall Amusement Park	7.2	67.1	4.3	390	11	C (III, IV, VI)
	3-25-69			8.8*	50.0	15.4	7,500	23	

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TABLE II
STATE OF MARYLAND
DEPARTMENT OF WATER RESOURCES
WATER QUALITY INVESTIGATION DIVISION

Maryland Water Quality Stations
Potomac River and Tributaries
Little Falls - Hallowing Point

County and Station Number	Date	Maryland Coordinates	Location	pH	Temp. °F	D.O. ppm	Coliform MPN/100 ml	E. coli MPN/100 ml	Water Use Group and Uses
Charles									
CH 2	6- 4-68	312.0-768.5	Potomac River	8.0	66.2	7.5	2,300	930**	C (III, IV, VI)
	3-25-69		At Buoy #67, Potomac River, off mouth of Dogue Creek and Marshall Hall	9.0*	50.0	15.1	4,300	23	
CH 3	6- 4-68	290.6-764.3	Potomac River	7.6	67.1	7.8	4,300	930**	C (III, IV, VI)
	3-25-69		At Buoy #59, Potomac River, off of Hallowing Point	9.0*	49.0	13.8	2,300	23	
CH11	5-13-68	300.5-777.5	Pomonkey Creek and tributaries	6.6	61.7	8.3	2,300	430**	C (III, IV)
	3-25-69		Md. Route #227 crossing Pomonkey Creek (Mill Swamp)	7.2	51.0	8.6	7,500	150	
CH12	6- 4-68	291.5-770.7	Pomonkey Creek	8.5	68.9	8.8	2,300	430**	C (III, IV)
	3-25-69		Mouth of Pomonkey Creek 3/4 mile southeast of Fenwick	9.2*	50.0	15.4	430	3.6	

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TABLE II

STATE OF MARYLAND
DEPARTMENT OF WATER RESOURCES
WATER QUALITY INVESTIGATION DIVISION

Maryland Water Quality Stations
Potomac River and Tributaries
Little Falls - Hallowing Point

County and Station Number	Date	Maryland Coordinates	Location	pH	Temp. °F	D.O. ppm	Coliform MPN/100 ml	_E. coli_ MPN/100 ml	Water Use Group and Uses
Montgomery VAX	3-25-69		Potomac River Maryland-D. C. line, Virginia side of River	8.0	52.0	11.1	2,300	23	B (II, III, IV, V, VI)
Prince George's VA1	3-25-69		Potomac River Maryland-Virginia line, mouth of Hunting Creek	8.1	50.0	9.8	93,000	23,000**	C (III, IV, VI)
VA2	3-25-69		Potomac River Maryland-Virginia line, mouth of Little Hunting Creek	8.6*	51.0	13.5	2,300	75	C (III, IV, VI)
Charles VA3	3-25-69		Potomac River Maryland-Virginia line, mouth of Gunston Cove	9.1*	50.0	14.1	430	9.1	C (III, IV, VI)
Prince George's PC1	3-25-69		Piscataway Creek Upper end of Creek	9.0*	51.0	13.9	4,300	430**	C (III, IV)
PC2	3-25-69		Piscataway Creek Mid-way in Creek	9.3*	52.0	13.9	2,100	9.1	C (III, IV)
PC3	3-25-69		Piscataway Creek Mouth of Creek	8.2	52.0	10.7	2,300	230	C (III, IV)

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TABLE II
STATE OF MARYLAND
DEPARTMENT OF WATER RESOURCES
WATER QUALITY INVESTIGATION DIVISION

Maryland Water Quality Stations
Rock Creek and Tributaries
Montgomery County
1968

Station Number	Date	Maryland Coordinates	Location	pH	Temp. °F	D.O. ppm	Coliform MPN/100 ml	E. coli MPN/100 ml	Water Use Group and Uses
1	7-22	420 -785	Rock Creek	7.9	73.4	7.8	24,000	1,500**	C (III, IV)
(M26)	4-16		Along Beach Drive at D. C. line	7.6	54.6	13.0	23,000	9,300**	
	12- 9			7.3	34.7	13.8	2,100	210	
2	7-22	422.4-782	Rock Creek	7.6	72.6	8.0	24,000	9,300**	C (III, IV)
	4-16		E.W. Highway Bridge, Route 410	7.7	55.4	12.0	75,000	9,300**	
	12- 9			7.5	34.7	14.3	2,300	930**	
3	7-22	423.4-780.8	Coquelin Creek	7.5	71.1	7.9	15,000	4,300**	C (III, IV)
	4-16		Jones Mill Road Bridge	7.9	57.8	14.0	230,000	230	
	12- 9			7.7	34.7	13.5	750	390**	
4	7-22	428.0-780.2	Rock Creek	7.8	73.4	8.5	110,000	2,300**	C (III, IV)
	4-16		Jones Mill Road Bridge	8.2	57.5	12.1	210,000	43,000**	
	12- 9			7.9	35.1	14.2	2,300	150	
5	7-22	429.2-773.6	Rock Creek	7.6	72.6	8.9	24,000	2,300**	C (III, IV)
	4-16		Beach Drive and Cedar Lane	8.3	59.0	12.9	9,300	430**	
	12- 9			7.9	36.5	14.1	4,300	23	
6	7-22	436.4-774.8	Rock Creek	7.6	72.5	8.6	24,000	4,300**	C (III, IV)
	4-16		Knowles Avenue Bridge, Route 547	8.4	59.0	14.1	430,000	430,000**	
	12- 9			7.7	36.9	14.5	9,300	93	

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TABLE II
STATE OF MARYLAND
DEPARTMENT OF WATER RESOURCES
WATER QUALITY INVESTIGATION DIVISION

Maryland Water Quality Stations
Rock Creek and Tributaries
Montgomery County
1968

Station Number	Date	Maryland Coordinates	Location	pH	Temp. °F	D.O. ppm	Coliform MPN/100 ml	*E. coli* MPN/100 ml	Water Use Group and Uses
7	7-22	444.5-773.7	Rock Creek	7.5	72.5	8.1	4,300	2,300**	
	4-16		Randolph Road Bridge	8.2	56.3	13.0	9,300	430**	C (III, IV)
	12- 9			7.8	37.4	13.9	1,500	430**	
8	7-22	446.6-774.1	Turkey Branch	7.6	78.4	10.9	24,000	1,500**	
	4-16		Viers Mill Road Bridge,	8.2	65.3	14.5	9,300	230	C (III, IV)
	12- 9		Route 586	7.3	35.6	14.2	1,500	430**	
9	7-22	450.7-769	Rock Creek	7.6	71.6	8.5	46,000	15,000**	
	4-16		Viers Mill Road Bridge,	8.7*	59.0	13.3	2,300	43	C (III, IV)
	12- 9		Route 586	8.2	37.8	14.5	1,500	21	
10 (M25)	7-22	457.5-767.2	Rock Creek	7.4	74.3	8.0	2,300	930**	
	4-16		Bridge on Norbeck Road,	8.5	63.5	12.0	4,300	430**	C (III, IV (Trout), V)
	12- 9		Route 28	9.4*	38.3	14.0	2,300	23	
11	7-23	462.3-766	North Branch	7.2	68.0	7.2	430	15	
	4-17		100 yards below Dam #1	7.2	52.8	9.4	75	<3	C (III, IV (Trout), V)
	12-10			8.6*	38.3	13.2	9,300	43	
12 (M24)	7-23	468.5-771	North Branch	7.9	74.8	9.0	4,300	230	
	4-17		Gaithersburg Road Bridge,	7.5	58.0	10.5	3,900	23	C (III, IV (Trout), V)
	12-10		Route 115	8.0	33.8	16.5	930	7.3	

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TABLE II
STATE OF MARYLAND
DEPARTMENT OF WATER RESOURCES
WATER QUALITY INVESTIGATION DIVISION

Maryland Water Quality Stations
Rock Creek and Tributaries
Montgomery County
1968

Station Number	Date	Maryland Coordinates	Location	pH	Temp. °F	D.O. ppm	Coliform MPN/100 ml	*E. coli* MPN/100 ml	Water Use Group and Uses
13	7-23	480 -770.4	North Branch	7.7	71.2	8.8	4,300	430**	C (III, IV (Trout), V)
	4-17		Bowie Mill Road Bridge	7.6	58.1	11.0	23,000	93	
	12-10			7.5	33.8	14.8	930	9.1	
14	7-23	461.7-764.6	Rock Creek	7.4	75.2	8.2	930	930**	C (III, IV (Trout), V)
	4-17		Avery Road Bridge	7.9	60.8	10.5	4,300	230	
	12-10			8.5	35.1	14.8	1,500	15	
14A	7-23	466.0-762.8	Crabbs Branch	7.8	73.4	8.4	3,900	930**	C (III, IV (Trout), V)
	4-17		In mouth	8.0	60.8	10.7	9,300	230	
	12-10			8.6*	35.6	16.3	2,300	230	
15	7-23	466.2-762.9	Rock Creek	7.4	73.4	7.6	430	230	C (III, IV (Trout), V)
	4-17		100 yards below Needwood Dam	7.3	56.4	9.6	430	<3	
	12-10			8.2	35.6	14.4	430	<3	
16	7-23	474.8-763.2	Rock Creek	8.1	76.3	9.4	3,900	2,300**	C (III, IV, V)
(M23)	4-17		Route 115 Bridge	7.6	60.8	10.5	43,000	150	
	12-10			7.9	33.8	14.9	2,300	93	

* Does not meet Standards
** Indicates need for sanitary survey

TABLE III
WATER QUALITY STATUS REPORT
Significant Industrial Sources

NAME OF SOURCE	LOCATION	RECEIVING WATER	EXISTING TREATMENT	VIOLATION OF DWR REGS. OR STDS.	DEPARTMENTAL ACTION 1969 F. Y.	STATUS OF INDUSTRY EFFORT 1969 F. Y.
MONTGOMERY COUNTY						
McCeney Sand & Gravel Co.	White Oaks	• Paint Branch	Settling	NONE	Monitoring and Surveillance	Approved waste-water disposal
Contee Sand & Gravel Co.	Kensington	Rock Creek	Oil Separator & Solids Removal	NONE	Monitoring and Surveillance	Approved waste-water disposal
Devlin Lumber & Supply Co.	Rockville	Crabs Branch	Oil Separator & Solids Removal	Upgrade treatment to comply with W. Q. Stds.	Investigation in progress	NONE
Eldorado Towers	Silver Spring	Northwest Branch	Chemical treatment and neutralization	NONE	Monitoring and Surveillance	Approved waste-water disposal
Maloney Concrete Co.	Bethesda	Little Falls Branch	Settling	NONE	Monitoring and Surveillance	Approved waste-water disposal
Metropolitan Fuels Co.	Bethesda	Little Falls Branch	NONE	Upgrade treatment to comply with W. Q. Stds.	Investigation in progress	NONE
Washington Petroleum Products Co.	Bethesda	Little Falls Branch	Oil Separator	Upgrade treatment to comply with W. Q. Stds.	Investigation in progress	NONE
PRINCE GEORGE'S COUNTY						
Andrews Air Force Base	Camp Springs	Henson Branch Meetinghouse Br. Cabin Branch Charles Branch	Oil Separator & Settling	Frequent or continued	Orders for correction	Continued or recurrent violation
Arundel Supply Co.	District Heights	Southwest Br.	Settling	Occasional	Investigation, followed by Orders for correction	Compliance with Department Order
Banning Plymouth, Inc.	Hyattsville	Northeast Br.	Oil Separator	Occasional	Investigation, followed by Orders for correction	Compliance with Department Order

TABLE III
WATER QUALITY STATUS REPORT
Significant Industrial Sources

NAME OF SOURCE	LOCATION	RECEIVING WATER	EXISTING TREATMENT	VIOLATION OF DWR REGS. OR STDS.	DEPARTMENTAL ACTION 1969 F.Y.	STATUS OF INDUSTRY EFFORT 1969 F.Y.
PRINCE GEORGE'S COUNTY						
Buffalo Sand & Gravel	Morning Side	Henson Creek	Settling	NONE	Monitoring and Surveillance	Approved waste-water disposal
Contee Sand & Gravel	Contee	Indian Creek	Settling	NONE	Monitoring and Surveillance	Approved waste-water disposal
Forrestville Sand & Gravel	Woodyard	Piscataway Creek	Settling	NONE	Monitoring and Surveillance	Approved waste-water disposal
Inland Materials Sand & Gravel	Clinton	Tinkers Branch	Settling	Occasional	Investigation, followed by Orders for correction	Compliance with Department Order
Lustine Chevrolet	Hyattsville	Northeast Br.	Oil Separator & Solids Removal	NONE	Monitoring and Surveillance	Approved waste-water disposal
Mineral Pigments Corp.	Muirkirk	Indian Creek	Chemical Treatment	Frequent or continued	Orders for correction	Continued or recurrent violation
Nu Look Car Wash	Hyattsville	Northeast Br.	Oil Separator & Solids Removal	NONE	Monitoring and Surveillance	Approved waste-water disposal
Potomac Sand & Gravel Corp.	Greenway Flats	Potomac River	NONE	Upgrade treatment to comply with W. Q. Stds.	Investigation in progress	Make concurrent investigation for study
Silver Hill Sand & Gravel Co.	Silver Hill	Henson Creek	Settling	Occasional	Investigation, followed by Orders for correction	Compliance with Department Order
A. H. Smith Sand & Gravel Branchville Plant	Branchville	Indian Creek	Settling	Occasional	Investigation, followed by Orders for correction	Compliance with Department Order

TABLE III
WATER QUALITY STATUS REPORT

Significant Industrial Sources

NAME OF SOURCE	LOCATION	RECEIVING WATER	EXISTING TREATMENT	VIOLATION OF DWR REGS. OR STDS.	DEPARTMENTAL ACTION 1969 F.Y.	STATUS OF INDUSTRY EFFORT 1969 F.Y.
PRINCE GEORGE'S COUNTY						
A. H. Smith Sand & Gravel Clinton Plant	Clinton	Butler Branch	Settling	NONE	Monitoring and Surveillance	Approved waste-water disposal
A. H. Smith Liquid Asphalt	Branchville	Indian Creek	Oil Separator & Solids Removal	NONE	Monitoring and Surveillance	Approved waste-water disposal
University of Maryland	College Park	Paint Branch	Settling (Flyash)	Occasional	Investigation followed by Orders for correction	Compliance with Department Order

Table IV
SPECIFIC WATER QUALITY STANDARDS - MARYLAND
DEPARTMENT OF WATER RESOURCES REGULATION 4.8

SECTION 7.30 BACTERIOLOGICAL STANDARDS (BACT.):

BACT. 1 **FOR GROUP A WATER USES** Most Probable Number (MPN) of coliform organisms to be less than 70 per 100 ml. of sample. Must comply with sanitary and bacteriological standards as listed in the latest edition of MANUAL OF RECOMMENDED PRACTICES FOR SANITARY CONTROL OF THE SHELLFISH INDUSTRY.

BACT. 2 **FOR GROUP B WATER USES** Group B waters must meet two separate bacteriological standards: one to protect potable water supply uses (Water Use Category II) and the other to protect water contact recreational uses (Water Use Category III; also related to Water Use Category IV).

Public or Municipal Water Supply Uses -- Monthly average value (either MPN or MF count) of coliform organisms not to exceed 5,000 per 100 ml. of sample; nor to exceed this number in more than 20% of the samples examined during any month; nor exceed 20,000 per 100 ml. in more than 5% of such samples. There must be no discharges of sewage, industrial waste or other waste that deleteriously affect the safety of the water supply and which could, in this manner, contravene the latest edition of the PUBLIC HEALTH SERVICE DRINKING STANDARDS (published by U. S. Public Health Service).

Water Contact Recreation Uses -- The bacterial quality of water is acceptable for these uses when a sanitary survey reveals no source of dangerous pollution and when the fecal coliform organism density does not exceed 240 MPN per 100 ml. When the fecal coliform organism density exceeds 240 MPN per 100 ml., the bacterial water quality shall be considered acceptable only if a second detailed sanitary survey and evaluation discloses no significant public health risk in the use of the waters.

BACT. 3 **FOR GROUP C WATER USES** The bacterial quality of water is acceptable for these uses when a sanitary survey reveals no source of dangerous pollution and when the fecal coliform organism density does not exceed 240 MPN per 100 ml. When the fecal coliform organism density exceeds 240 MPN per 100 ml., the bacterial water quality shall be considered acceptable only if a second detailed sanitary survey and evaluation discloses no significant public health risk in the use of the waters.

SECTION 7.40 DISSOLVED OXYGEN STANDARDS (D.O.):

D.O. 1 For all water use categories other than IV, dissolved oxygen concentrations must not be less than 4.0 mg. per liter at any time, except where--and to the extent that--lower values occur naturally.

D.O. 2 **FOR GROUP A, B & C WATER USES** For "trout waters," so designated to the Department by the Department of Game and Inland Fish, the dissolved oxygen concentration must not be less than 5.0 mg. per liter at any time, with a minimum monthly average of not less than 6.0 mg. per liter. For the propagation of fish and other aquatic life (Water Use Category IV) in all other waters, the dissolved oxygen concentration must not be less than 4.0 mg. per liter at any time, with a minimum monthly average of not less than 5.0 mg. per liter, except where--and to the extent that--lower values occur naturally. Any deviation, other than natural, from the above requirements is to be evaluated for risk to the propagation of fish and other aquatic life by the Department of Game and Inland Fish for nontidal waters, by the Potomac River Fisheries Commission in those waters of the Potomac River and its tributaries under the jurisdiction of the Fisheries Commission, and by the Department of Chesapeake Bay Affairs with respect to all other tidal waters, and will be permitted or denied by the Department of Water Resources after consultation with the aforementioned agencies.

MR. STEIN: Thank you.

MR. McKEE: Thank you, Mr. Chairman.

MR. STEIN: Are there any comments or questions from the conferees?

MR. JENSEN: Mr. Chairman, I have several questions, if I may?

MR. STEIN: Go right ahead.

MR. JENSEN: Mr. McKee, on page 7, the recommendations refer, of course, to your recommendations.

I wonder if those also apply to the Maryland Department of Health. Does this represent a consolidated statement for the State?

MR. McKEE: Mr. Jensen, this document was strictly a Department of Water Resources document. It was not cleared with the State Department of Health prior to its distribution.

MR. JENSEN: I will have to ask the same question then of Mr. McKewen later.

MR. McKEWEN: Assuming you want me to answer that, as Mr. McKee stated, these were the recommendations of the Department of Water Resources and did not represent a joint statement, but the Health Department does find itself in substantial agreement, bearing in mind that most of these are obvious things that need to be done and that these are recommendations with which we are going into the conference and are subject to elaboration or modification during the conference itself.

MR. JENSEN: Thank you.

Mr. McKee, your Table II indicates that some recent information on water quality standards or on the quality of the water in the Maryland portion of the river is consistent with the FWPCA data that indicates that standards are not now being met?

MR. McKEE: Basically, this does agree with the Federal data, yes.

MR. JENSEN: The third one then is on your recommendation regarding the provision of higher levels of waste treatment and phosphorus reduction necessary to attain compliance with these water quality standards. Could you or would you want to express this in terms of percentage removal or total number of pounds?

MR. McKEE: No, sir, I am not prepared to do that at this time.

MR. STEIN: Well, I will ask questions along the same line. Let me put this to you and you can comment. Let's take the easy one first.

What you talk about is phosphorus reduction facilities to be provided for all wastes discharged to the Potomac Estuary. I think it is determined that 80 per cent of the loading comes from Blue Plains, with 40 per cent of that loading coming from Maryland sources.

If you are talking about phosphorus reduction facilities, I take it that you mean the Blue Plains facility, and I also take it, from listening to Mr. Jackson and Dr. Sawyer, that their present plans do not call for phosphorus reduction facilities.

In other words, you are recommending something beyond what the District is proposing in its program in the next five-year period on phosphorus?

MR. McKEE: I would say that is correct, Mr. Chairman.

MR. STEIN: Right.

MR. McKEE: I am also thinking in terms of the load that comes into this area from further upstream in the fresh water portion, that we have phosphorus coming downstream into the District area from upstream.

MR. STEIN: Right.

Now, let me refer to your recommendation No. 1. You say:

"Waste treatment and disposal facilities be provided and maintained to ensure compliance with water quality standards."

These have been adopted by Maryland, the District and Virginia.

Let's assume that the computations of Mr. Jensen's group and Mr. Cook are correct, and if you need 96 and 98 per cent to provide reductions for compliance with water quality standards, as I understand it, this is again not provided for in the five-year projection of the District, and this is on the assumption that their computation in their report is correct.

I have heard nothing yet to indicate that these computations are erroneous or that there is some doubt about it.

MR. McKEE: I don't say that they are erroneous, Mr. Chairman. I simply say that the purpose of this conference is to decide what needs to be done in this area in order to mee t the standards that have been established.

MR. STEIN: Let's go over this again. What you want to do is meet the standards.

Let us assume--and I don't make this

assumption on the basis of a conclusion--that in the absence of data to the contrary, that what Mr. Cook and his investigatory group have shown is correct, that they need very high reductions of BOD and of phosphorus to meet these standards. As far as I can see it, again placing this in juxtaposition of the District program for the next five years, if Mr. Cook's computations are correct the implication is we have to go beyond that in order to achieve the standards.

I see no other conclusion unless their technical work is not valid, in reading your recommendation.

MR. McKEE: I think you stated it very well, Mr. Chairman.

MR. STEIN: All right. Are there any other questions or comments?

MR. JENSEN: I have one further question.

Mr. Klein earlier this morning raised some questions about an aluminum plant that was being built in Frederick County. I believe you indicated at the time that a permit had not been issued as yet.

I wondered if you wanted to elaborate on that briefly at this point.

MR. McKEE: I would be glad to, Mr.

Jensen.

First of all, the comment was that there had been some legislation or law established that prohibited discharge of waste material to the Potomac River 50 miles above the District line. I know of no such legislation. I have been completely unable to find such legislation or any reference to it since yesterday.

There is and was an agreement between the States, a nondegradation type statement, immediately following the construction of the Dulles Interceptor. This might be what Mr. Klein was referring to, but there is no legislation as such that would prevent the discharge of any material to the Potomac River for a 50-mile stretch above the District line.

Regarding the aluminum plant, there is no permit issued yet. There are discussions under way between my department and the company regarding this matter, but there are no permits issued for this plant at the present time.

MR. JENSEN: Thank you.

MR. STEIN: Are there any further comments or questions?

(No response)

MR. STEIN: The others may not relate to this, but, you know, you raised an interesting point, Paul.

In your first statement you say:

> "Although the State of Maryland has established Little Falls as the boundary of tidal and nontidal waters for the Potomac River, the River--in point of fact--it is free flowing and nontidal from the Northwest boundary line of the District of Columbia upstream to Little Falls."

In other words, what I really can do is fish in the nontidal waters of Maryland without a fishing license and not be hooked.

MR. McKEE: That is exactly correct, Mr. Chairman (laughter).

MR. STEIN: I never knew that until now. Thanks.

MR. McKEE: My Department was instructed by the Maryland Legislature in 1964 to promulgate a regulation establishing the boundary between tidal and nontidal waters exactly for this purpose.

MR. STEIN: Yes. Thank you.

Do you have any other people from Maryland?

MR. McKEE: I have quite a few.

MR. STEIN: Why don't you proceed to call them, you and Mr. McKewen.

MR. McKEE: At this point, Mr. Chairman, I would like to call Dr. Al Machis of the Washington Suburban Sanitary Commission to present a statement.

STATEMENT OF
DR. ALFRED MACHIS
DEPUTY CHIEF ENGINEER
WASHINGTON SUBURBAN SANITARY COMMISSION

DR. MACHIS: I am Alfred Machis, Deputy Chief Engineer, the Washington Suburban Sanitary Comission. The statement I am presenting is on behalf of this Commission.

The Washington Suburban Sanitary Commission is the agency designated by the Maryland General Assembly with responsibility for providing sewerage in Montgomery and Prince George's Counties. Its jurisdiction includes all of the two counties (except the City of Rockville. the Belair section of the City of Bowie and the Town of Upper Marlboro)--an area of almost 1,000 square miles. Functions include the planning, design, construction, operation, maintenance and financing of the system.

The Commission has invested over $175 million in the sewerage system with more than $65 million having been spent for the construction of pollution control plants on the Patuxent River and on the Potomac River and for some 360 miles of interceptor and trunk sewers. Contrary to the much publicized declarations that the Federal programs have materially advanced the pollution abatement program our experience is that the Federal assistance has been only a small part of the total program. To date less than $4 million in Federal grants have been authorized toward Commission projects.

Sewage collected in the Commission's system in the Potomac River basin is carried to either the Water Pollution Control Plant at Blue Plains in the District of Columbia or from the Henson Creek, Broad Creek, Swan Creek and Piscataway Creek Basins to the Piscataway Wastewater Treatment Plant for secondary treatment. The Commission and the District of Columbia, by agreement, share the capital and the operating costs of the D.C. facilities. This includes Project "C" and the Potomac Interceptor as well as all other jointly used facilities. Maryland has contributed to enlarging and improving sewerage facilities in the District of Columbia in the amount of $12.5 million, has agreed to contribute $5.25 million toward the Potomac Interceptor and is paying one and three-quarter million dollars annually toward the operating costs. The District of Columbia has reported in considerable detail on the Blue Plains plant.

The Piscataway Wastewater Treatment Plant is a modern efficient installation using the latest technology for the treatment of sewage. It is an activated sludge process designed for a nominal capacity of 5 million gallons daily for a BOD reduction of 90 per cent and a capacity of up to 8 million gallons daily with a BOD reduction of 85 per cent. Actual operating data for the last six months for an average flow of 4.75 mgd showed a raw BOD coming into the plant of 152 mg/l and an effluent BOD of less than 14 mg/l with an overall operating efficiency of 91 per cent BOD removal. Consultants are now designing an expansion of this plant for secondary treatment of an additional 25 mgd. It is expected that part of this addition will be in service in 1970 and the total plant will be completed in 1971.

The Commission and the FWPCA entered into an agreement in December 1966 to construct a demonstration tertiary treatment plant at Piscataway of a 5 mgd capacity at an estimated cost of $2.2 million. Consultants were retained by the Commission and after further study advised that a plant of this size would cost $3.2 million. The Commission has agreed to pay the local share of this additional cost and has been advised that FWPCA will provide the Federal share. However, at the time of writing this report the Commission had not received confirmation of the Federal approval.

The tertiary plant is proposed as a demonstration project to establish the cost of initial construction, operating cost information, and the feasibility of full scale plant operation. It will include chemical precipitation of phosphates and further reduction of residual BOD from the secondary sewage plant effluent, sand filtration, and carbon adsorption of refractory organics.

The FWPCA report, Potomac River Water Quality, 1969, places particular emphasis on improving the Potomac River in the metropolitan Washington area for water contact and recreational features which provides the most stringent proposed future use. It mentions also the improvement of quality for fish propagation and navigational uses. However, no indication of cost and benefit attained is made for any of these uses.

For water contact and recreational uses particular emphasis is placed upon coliform reduction in sewage so that the receiving water will contain no more than 240 fecal coliforms per hundred milliliters (the Maryland Water Quality Standard). It may be of interest to examine data on the coliform content of existing natural streams in the area.

Included in the previously cited report are tables of coliform counts at several stations along Rock Creek. Generally these counts are in the magnitude of 2,000 total coliforms per 100 milliliters. It is to be emphasized that this basin in its upstream extremity is a rural area and in its middle range to the Maryland boundary is a densely developed suburban area. Contrary to the statement in the FWPCA report, Rock Creek in the Maryland area receives no pollution from sewage discharges (except rare, occasional overflows resulting from a sewer stoppage) and should be considered a stream with as high a water quality as can be attained under such circumstances. The data indicate that runoff from rural areas as well as suburban areas are sufficient to exceed the hoped for criteria even without sewage discharge.

Let us consider for one moment another stream--the upper area of the Patuxent River. Although it is not tributary to the Potomac River, it is a local example that is indicative of stream quality that can be expected from a totally rural area. The U. S. Geological Survey has published a map and charts titled Pollution Index of Streams from data collected on the Patuxent River in 1961-1963. At the entrance to Triadelphia Lake on the Patuxent River and in the very upper portions of the Middle and Little Patuxent Basins, the index shows that the coliforms exceed 2,000 per 100 milliliters more than 65 per cent of the time. Special notice must be taken that at these points the Patuxent River Basin is rural in character with none of the traditional urban sources of pollution and yet the water contains prodigious quantities of coliform bacteria.

The October 1965 report Summary of Water Quality Potomac River Basin in Maryland, prepared by the Chesapeake Bay-Susquehanna River Basins Project, Charlottesville, Virginia, contains information that the coliform content of the Potomac River at Great Falls normally is in the magnitude of several thousand per hundred milliliters. It would appear that the water coming into the metropolitan area before reception of the waste discharges normally exceeds the projected goal.

With the present state of knowledge it is quite hazardous to attempt to project plant construction and operating costs needed to attain the objective of the FWPCA to remove 96 per cent of the phosphates and 96 per cent of the BOD. Any such estimate would have to be looked upon as being subject to considerable error.

Culp's estimates based upon the experience at Lake Tahoe if applied to the population projected by the Council of Governments for Maryland of 3,700,000 persons would indicate a capital investment in tertiary plants of approximately $60 million. The operating cost[1] would be in the order of $13 million annually. Costs such as these could approach doubling the current sewer usage charge in Maryland. Before a final decision is made to enter upon a program of this magnitude, it would be absolutely essential to know that the expenditure will attain the projected goal.

Unfortunately, phosphate reduction in sewage discharges may not improve the river to the extent

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1) cf FWPCA-Summary Report Advance Waste Treatment, WP-20-AWTR-19.

expected. An eminent board of scientists from the Johns Hopkins University in the report A Research Program for the Potomac River, 1965 stated and I quote:

> "The most distressing aspect of these 'ball park' estimates of the situation is that the phosphorus concentration in the River may stay above acceptable limits even if all phosphorus is removed from sewage plant effluents. It is quite likely that algae blooms, perhaps reduced in frequency and intensity, will continue to be a problem in the Tidal River in spite of all the pollution control measures that can be devised."

There really is not much good information available in the literature on the inhibiting effect of low phosphorus concentrations upon the natural growth in an estuary. That information which is available shows a wide range of variation. Sawyer states:

> "Experience has shown that such blooms do not occur when nitrogen and/or phosphorus is present in very limited amounts. The critical level for phosphorus has been established as somewhere near 0.01 mg/l."

In the light of our limited knowledge of the effect of phosphorus removal from sewage effluents it would appear that the appropriate step is to assemble scientific information on the Potomac Estuary, as outlined in the previously cited report, and establish the effect of modification of waste discharges upon the estuary. While these studies are being pursued, such demonstration projects as the Piscataway tertiary plant should be completed so that our knowledge of the feasibility of full scale plant operation can be established. If information developed from this project warrants further expansion of its scope, such decisions would be made at the appropriate time.

There is now question that sewage contributes substantial quantities of phosphorus to the receiving stream, and that phosphorus is a basic element necessary for algal growth. The technology for phosphorus reduction in sewage effluents is available. The WSSC stands ready to proceed with whatever is necessary in the way of tertiary treatment plant construction and operation. I must emphasize, however, that the Commission is a creature of the people and that it intends to produce the quality of sewage effluent that meets the needs of the people. The Federal Government must produce the necessary basic research that will assure that once the many millions of dollars necessary for this program are committed, that the resulting improvement in the river quality is firmly assured.

The river is reportedly sick. We have barely taken its pulse, yet a prescription has already been formulated!

SECRETARY KLEIN: Are there any questions from the gentleman on my left?

(No response.)

SECRETARY KLEIN: Mr. Stein.

MR. STEIN: There are several points in here which sort of amaze me, very frankly.

One is the notion of using coliform from land runoff and trying to equate that with coliforms in the D. C. area.

Now, we have been working in this field for a long time and know that coliforms are pollution indicators in the system, and that when they are related to the discharge from sewers they have quite a different meaning than when they come from the land area.

I think if you are talking about coliforms that we get in a count of runoff from farmland and rural land and coliforms in a count that we get below a municipal outfall, as we do in the Washington metropolitan area, we have two very different things, and, as far as I know, this has been settled pretty much for the last 20 years.

You also have the notion in here where you state:

> "In the light of our limited knowledge of the effect of phosphorus removal from sewage effluents, it would appear that the appropriate step is to assemble scientific information on the Potomac Estuary, as outlined in the previously cited report,"

and so forth and so on.

We have heard not only testimony here but in other places, such as in Lake Erie and in Lake Michigan, where the five States in Lake Erie and the four States in Lake Michigan have embarked upon a substantial phosphorus reduction program to stop the growth of algae and stop eutrophication of the lake.

Indeed, it seems very peculiar to me at this stage that we again have to talk about doing further study before we embark on the problem.

The last point it seems to me is the most amazing of all, because I have worked in this field for 25 years, and it seemed to me that the ones responsible for treating the wastes were the people who discharged the waste into the stream, including any source, municipal or industrial or whatever it is, but here we have a new rule.

Let's read it:

> "The Federal Government must produce the necessary basic research that will assure that once the many millions of dollars necessary for this program are committed, that the resulting improvement in the river quality is firmly assured."

Here are cities and in other places of the country industries pouring millions of gallons in. They don't have the responsibility to clean this up until the Federal Government assures them by their research that this is to be done?

This is a complete reversal of the law of the land as I have understood it up to now, and I really can't understand these statements.

SECRETARY KLEIN: Any comment?

DR. MACHIS: I would be delighted.

First of all, let's deal with the coliform problem. I am merely taking your data out of your report. I don't know whether this is an indicator of pollution or not.

I have heard many speeches off this rostrum in the last two days saying that Rock Creek is grossly polluted.

I presume that any coliform index counts that you have made and published are confirmed coliforms and not presumptive.

SECRETARY KLEIN: It was just a question of the type of coliform, because we were referring mainly to the coliform that would be from human sewage, and you were referring to it as runoff from land without definition as to what type of coliform it was.

DR. MACHIS: I didn't make this test. I am merely taking your data, sir, and I presume that you all confirmed these for fecal coliforms and said these are confirmed tests.

When you say they are pollution indicators, certainly those of us who read your reports must assume that you know what you are doing and what you are talking about.

Insofar as the objection to further study for phosphate removal, we are not objecting to the phosphate removal. As a matter of fact, I would say Maryland is a leader in this aspect.

We have agreed to install a tertiary plant. We agreed two-and-a-half years ago to do this.

We are still waiting for the Department of the Interior to come up with its share of the Federal money to do the job.

The point we are making is that we should proceed with this tertiary treatment plant to attain the objectives which I have enumerated in my paper that I read here this afternoon. I think this is an appropriate step.

What I am saying is the Federal Government has not been leading in this area of either providing tertiary treatment and providing its share of the funds, nor has it been leading in providing the basic research that is required to assure that once these many, many millions of dollars of local funds are committed to these projects, that we really will attain the goal of a clean river that we all want.

We are not objecting to the clean river. What we are saying is, and repeating it, I might add, as many other speakers have already noted from this rostrum, that the complete removal of sewage efflent from the river does not assure that you will still not have the same problems. Considerably more is necessary than phosphate reduction in the river, and I think it is incumbent upon the Federal Government to show the national picture as wellas the local picture of what is involved in this aspect.

There was mentioned by Dr. Bartsch yesterday that the phosphates coming down the river were adequate to support algal blooms. Other experts can be quoted, as we have quoted one group in our paper, that this is true.

Therefore, as he pointed out earlier, it is necessary to come up with a total program for phosphate reduction in this valley if one is to be assured that the objective is to be attained.

The cost of this total project must be given to the people so they will know what kind of costs they are faced with.

I think it would be a tremendous tragedy for us to proceed and spend many millions of dollars on the basis of declarations that this is going to solve the algal problem of the Potomac River, and then, a few years later have it turn out that it failed to do that.

Even your own report indicates that it is going to be many years after phosphate reduction is effected before any effect will be seen on the river.

I am not sure whether this is a dodge or what it is. We want to be assured by you, if you are proposing that this be done, that it is going to work, and I think the Federal Government has the charge of coming up with this kind of research. It is a national problem, not just ours.

SECRETARY KLEIN: No, sir. No, sir.

You are the one who is putting the sewage in there, and you are charged as the operators of a sanitary commission with cleaning up that water before you put it back in. That is your duty, operating sewage treatment plants. It is not the Federal Government's.

The Federal Government is coming into this now because local sewage treatment operators are not doing the job properly, and, as a result, the Potomac River has become grossly polluted. We also find that it comes from other sources.

Today, we are not going into all of these sources, but I have time and again said that these other sources have to be looked into.

You cannot dodge the issue by throwing it back to the Federal Government. The only reason the Federal Government is in the picture now is that the local governments did not do it before.

Are you going to beg the issue again, or are you going to do the best possible job? Are you going to research this one yourself and come out with the answers?

To say that we are wrong, you will have to say to us that tertiary treatment with removal of the nitrates and phosphates will not do the job, should not be used, that 90 per cent therefore is sufficient, that we cannot pass this on to the people, and that it won't do any good to do this.

Now, that is your proposition. You can't throw it backto the Federal Government. The Federal Government is in this picture because of only one reason: the failure of local governments to do their proper job.

Sir, if youdon't want to do it this way, what is your alternative plan for cleaning up the river as far as you are concerned?

DR. MACHIS: Read the paper, sir.

I have already given it. This is a question I could argue with you, I suppose, all day. I don't think anything could be achieved by that type of thing. I think we have made our point.

We are not a producer of this. We are merely the arm of the people of this area that is doing the kind of job that the people want done at the price they are willing to pay, and we are ready to move ahead.

As I said earlier, we have already promised our share and obligated our share for tertiary treatment.

What has the Department of the Interior done?

SECRETARY KLEIN: The Department of the Interior is charging you with putting the water back in the best possible condition to clean up the Potomac River, period. That is what your job is.

Let me ask some questions. You are talking about users' charges.

Every time I hear these fantastic figures are being spent here and there, and yet I know where the fantastic figures are beingspent. They are being spent elsewhere.

How many people do you service?

DR. MACHIS: Total area, we serve over a million one.

SECRETARY KLEIN: One million people. What is your budget for a year?

DR. MACHIS: Our budget is over 100 million annually.

SECRETARY KLEIN: $100 million.

That leaves us $100 per year per person; is that correct?

What are your sewage user charges per month?

DR. MACHIS: I would be glad to send you the schedule. I don't think it would be appropriate for me to try to enumerate all of the costs that our users pay. It is a multi type of cost, including not only sewer use charge but house connections, service charges, etc.

SECRETARY KLEIN: How much of this is just on the anti-pollution end of the deal and not paying off bond issues and the rest of it?

To put it a different way, how much can we reduce this to per person per day for pollution control?

DR. MACHIS: I don't know, sir. I have never figured it out.

SECRETARY KLEIN: Well, this is the problem we are getting to. Everybody throws up fantastic figures of what it will cost to do this, that or the other thing.

Gentlemen, if you are going to go this way, then all we can do is say we will leave the Potomac polluted.

Now, what do you do with it? It is unusable. Nobody can use it.

We can't do that either. We have got to do the best possible job that is attainable, and I think that certain people who have made statements today have done a disservice to their communities.

I think the people in the communities want to get this job done, and all they want to know is what does it really cost us to get that job done if it will do the job. If it won't do the job, then I want you to say that this 96-98 per cent removal with phosphorus and nitrogen removal will not do the job, that what you are doing now is sufficient to do the job, provided that you stand behind it, and at the end of five or ten years, you report back to the people on the condition of the Potomac, because that you can't run away from.

DR. MACHIS: I didn't say that we don't want to provide phosphorus removal. You have misunderstood this. You are the one that said it.

I said that two and-a-half years ago we were ready to install the tertiary plant to provide phosphorus removal. We are still waiting for the Department of the Interior to come up with its agreed-upon share.

SECRETARY KLEIN: You are going to keep polluting the Potomac, and if the Federal Government doesn't come up with its share, you are not going to do your share?

DR. MACHIS: You have agreed to a share, but you haven't come up to it.

SECRETARY KLEIN: I didn't agree to anything yet, sir. I have just taken office two weeks ago. I know what I am trying to do.

DR. MACHIS: The Department of the Interior--excuse me--not Mr. Klein, sir.

SECRETARY KLEIN: All right.

DR. MACHIS: I hope you would agree.

SECRETARY KLEIN: Still if they don't come up with their share, are you going to stop operating the plant? Are you going to stop putting things into the Potomac? Are you going to tell the people that they can't use the sewers and sewage treatment because the Federal Government hasn't come up with money? Or are we going to get the job done somehow or other?

The State of Ohio is going to get it done somehow or other. The City of Chicago is going to tertiary treatment with removal of phosphorus also, and they are only getting the same amount as you are getting.

DR. MACHIS: I would hope, Mr. Klein, you do stand behind the Department of the Interior agreement to furnish this money for the tertiary plant. If you don't, we are all going to be disappointed.

SECRETARY KLEIN: I have already made my position clear, and so has Secretary Hickel, and that is that we know funding is part of the problem.

Now, if the Federal Government finds that it cannot fund it, are we going to stop dead?

That is the question to you, sir.

DR. MACHIS: Are you withdrawing already from the grant?

SECRETARY KLEIN: No. I am just asking you.

DR. MACHIS: Is that what you are saying? If you are not--

SECRETARY KLEIN: If we cannot get the Federal Government to come up with the money.

DR. MACHIS: I will wait until I hear the answer of the Department of the Interior on the grant, if you are asking that question.

SECRETARY KLEIN: And if you don't get it?

DR. MACHIS: We will make that decision when you tell us.

SECRETARY KLEIN: Then you are not going to do anything?

DR. MACHIS: I don't know. I said we will make that decision when you tell us that you are not going to give us the grant. I hope you don't say that.

SECRETARY KLEIN: In other words, "I will do it if."

That won't do. No, the proposition is either we clean up the Potomac or we don't, and that's the answer, regardless from where we get the funds.

Are there any further questions on my right?

(No response.)

SECRETARY KLEIN: Mr. Stein?

MR. STEIN: I think we may have a footnote for the record.

As I understand it, this $100 million budget for the Washington Suburban Sanitary District is for water supply as well as pollution control.

SECRETARY KLEIN: Is that correct?

DR. MACHIS: Total budget, sir.

SECRETARY KLEIN: Then, in other words, you gave me a phony figure because it includes supply as well as pollution?

DR. MACHIS: You asked me for the budget of our organization. I gave you the budget of our organization.

I don't know all the parts of the budget.

SECRETARY KLEIN: Well, very frankly, let me ask this question: You are now putting pollution of so many pounds per day into the Potomac. Are you going to stop the building and subdivisions in your area so that you don't put any more pollution into the Potomac?

You know that your answer is "No, we are not going to do that."

For the people who are coming in, are you going to put in better treatment plants? Are you going to insist on it as they come in so that it is covered by new subdivisions?

The answer is, of course -- and I have seen this all over the country -- no, we are not going to do that either. You can't pass that one back to the Federal Government, because you are a growing area and you are just going to have to meet a lot of these problems on your own. You can't pass everything to the Federal Government.

MR. JOHNSON: Mr. Chairman?

SECRETARY KLEIN: Yes, sir.

MR. JOHNSON: I would like to ask a question.

Al, on the first page of your statement where you make reference to this $5 million having been spent for construction of pollution control plants on the Patuxent and the Potomac, do you have a figure or a breakdown on that?

DR. MACHIS: I am sure we can get it. I don't have it with me, but read the rest of it, and for some 360 miles of interceptor. I don't want to mislead.

MR. JOHNSON: Yes. I just wondered if you had a breakdown.

DR. MACHIS: I think we have it, yes. We can furnish that if we need to.

SECRETARY KLEIN: Anything further, gentlemen?

(No response)

SECRETARY KLEIN: Thank you very much.

MR. McKEE: I would now like to call Mr. Frazier Kellogg to speak.

STATEMENT OF

MR. FRAZIER KELLOGG

CABIN JOHN CITIZENS ASS'N.

MR. KELLOGG: Mr. Chairman, I would like to preface my statement with a question based on testimony that I heard here this afternoon.

Is it my understanding that the Department of Health is telling this conference that the Cabin John Creek does not contribute raw sewage pollution to the Potomac River?

SECRETARY KLEIN: I haven't the slightest idea.

MR. KELLOGG: Well, a statement was made earlier today by the Department of Health. Will they corroborate it or not?

SECRETARY KLEIN: Mr. McKewen, would you answer, please?

MR. McKEWEN: I did not make that statement, sir. I referred to interceptors which have been built to remove raw sewage discharges either continuous or intermittent, and, frankly, without looking at the statement, I am not sure whether that point was among those or not.

I also indicated that we are, through the local health departments, stepping up efforts to uncover any additional ones and will continue to support efforts by the local jurisdiction, in this case primarily the Washington Suburban Sanitary Commission, to reinforce interceptors where needed to prevent any additional discharges which may exist now or may occur in the future.

MR. KELLOGG: All right.

I will proceed with my statement, and this is a statement that was approved by the Cabin John Citizens Ass'n. I will disagree every once in awhile, and these are my own responsibilities.

SECRETARY KLEIN: You had better be careful when you do that, or you will wind up with the Citizens

Ass'n. being responsible for everything you say.

MR. KELLOGG: The Cabin John Creek is a woodland stream flowing through a public parkland in Montgomery County, Maryland. It empties into the Potomac River roughly eight miles from the center of Washington, D.C., and only a few miles above a major drinking water intake for the District of Columbia.

The Creek is polluted by raw sewage. What appeared to be intermittent pollution from sewer line overflow a few years ago now appears to be more continuous. Sewage from overflows appears to be supplemented from underground sewer line leaks. The word appears is used advisedly because the claim of pollution is based on visual rather than empirical observations.

The lack of pollution analysis in the hands of state or county agencies who have varying degrees of responsibility and ostensibly accountability to the public is almost more shocking than the pollution itself. A recent inquiry to the Montgomery County Department of Health for pollution measurement assistance was met with the response that the county only tests for drinking water standards. On the other hand, the D.C. Health Department does test the Creek water each week at one point--

below the overpass of the George Washington Memorial Highway. The Cabin John Citizens Association is making arrangements for obtaining and analyzing that data.

That a citizens association, rather than responsible public agencies, should have to indicate and apparently prove the pollution of a valuable natural resource is discouraging at least. Beyond that, it would appear that there is an outright malfeasance of public trust. Indeed, it appears that actions of some public agencies have contributed to the pollution itself. Other agencies have not undertaken basic remedial action.

What follows is a layman's analysis of what appear to be the sources of pollution and a list of public agencies, which incidentially is not complete, with their relevant responsibilities.

First, the flood stage of the Creek has been increased substantially by storm runoff from Interstate 495 and the connector link to the George Washington Memorial Parkway.

This is a digression. Why that connector had to be built up in the first place is beyond me when it would take about a minute and-a-half to connect up with the George Washington Memorial Parkway at its present location at the Potomac River Bridge.

It is one thing to have the Creek be a receptacle for the runoff of 495, when there are just acres and acres of concrete spillways, and to have it added to by this apparently useless piece of highway that was built through one of the most beautiful pieces of woodland in Montgomery County.

A moderate rainfall raises the Creek level higher than some of the sewer manholes or lines along the Creek fall line.

Second, stranded flood debris contains a substantial amount of wood, metal, stone and plastic objects which are used in building construction activities. These objects sometimes enter the sewer lines and help to clog them when the Creek is at flood stage.

Third, there is a substantial amount of silt in the water at flood stage. While the highway department has controlled the soil erosion problem on the highway right of way, there is a fairly obvious erosion problem on land in private housing developments on both sides of Interstate 495 just north of the River Road Interchange. This erosion will be photographically documented by the Citizen's Association.

Fourth, there is evidence of continuous, subsurface sewage leaks when water levels are normal.

Fifth, the visual evidence of raw sewage in the Creek is substantial. At low water the bottom and banks have a coating of coagulated fat. Toilet paper and contraceptive devices are both afloat and hanging in the streamside brush.

The Washington Suburban Sanitary Commission is responsible for the sewer lines in the Creek fall line. It is well aware of the sewage overflows. 'Phone calls have been made to inform it of subsurface line leaks. Remedial action thus far consists of replacing displaced manhole covers and sprinkling disinfectant on overflow areas.

I will personally say also, and this is my own interjection, that one of the most disturbing aspects of a citizen's relationship to an agency is the lack of responsiveness of that agency. When a complaint is registered, there is absolutely zero followup on what remedial action has been taken. and, indeed, to even admit that there is a problem.

Several years ago, a Commission member blamed intermittent overflows on pranksters who placed debris in the lines.

Lines in the Cabin John watershed serve an area as far away as Rockville. It should be noted that in its five year program for sewage, adopted October 1, 1968, there is no discussion of the lines in the Cabin John watershed, much less pollution in the Creek. Individual and intermittent contact with the Commission over a period of five years has not elicited acknowledgment of the fact that the Creek is polluted with raw sewage aside from reference to the above comment about pranksters. Individual complaints about overflow are not formally acknowledged.

Pollution conditions have been pointed out to staff of the National Capitol Park and Planning Commission. This agency has responsibility for the Cabin John Park, through which a substantial part of the stream passes. There is no indication what, if any, efforts have been made by this agency to remedy the situation.

The Montgomery County Department of Health, as already indicated, has declined to test the water for pollution.

In its consideration of pollution of the Potomac River, a decision was made by the Interstate

Commission on the Potomac to postpone or preclude consideration of small stream contributions to the overall problem. Aside from the raw sewage flowing into the Potomac from the Cabin John Creek, the Cabin John Park and Creek are major environmental resources in their own right and are deserving, in the opinion of the Cabin John Citizen's Association, of more responsible public action.

SECRETARY KLEIN: At this time, rather than go to questions, I think that two people should be given the opportunity to reply. The first one is Mr. McKewen. Mr. McKewen.

MR. McKEWEN: Thank you, Mr. Chairman.

Mr. Kellogg, do you know if this problem was ever brought to the attention of the State Health Department?

MR. KELLOGG: Not of the State.

MR. McKEWEN: Suppose you get my name and address so that you can contact me in the future. I can assure you we will take a look at this and discover the cause and take whatever remedial measures can be taken.

We have spent a great deal of money in the past decade on putting in reinforced interceptors and pumping stations to eliminate this kind of condition, and if it still occurs, we will certainly work with the sanitary commission and with the County to have it cleaned up.

But, in the future, should you have any additional problems, I wish you would contact us directly.

MR. KELLOGG: Well, Mr. McKewen, one of the difficulties from the standpoint of an individual citizen, much less a citizen's organization, is to know which agency to turn to.

SECRETARY KLEIN: You have already gotten that answer now, Mr. Kellogg, so you don't have to worry about it. Mr. McKewen put his agency at your disposal, and he says he will give you his name and address and phone number.

MR. KELLOGG: But I would like to make one further comment, Mr. Chairman, and that is an awful lot was said about WSSC as far as maintaining the interests of the public is concerned, and I think that any agency that is seriously going to consider this from the answer level has to ask where the accountability of that agency goes to. It is accountable only to the Government.

SECRETARY KLEIN: And now, Dr. Machis, would you like to reply?

DR. MACHIS: I would like to accept Mr. McKewen's suggestion here that he furnish whatever data he has in writing to Mr. McKewen so that we can take it up and look into the specific details, because I am not at all at this moment familiar with what he is talking about or where.

But, we will certainly be delighted to go into it in detail with the Maryland State Department of Health and find out what can be done.

SECRETARY KLEIN: Would you furnish your name and address and 'phone number to him also, please?

DR. MACHIS: I would be glad to.

SECRETARY KLEIN: Thank you.

Are there any questions of Mr. Kellogg by other members of the panel?

(No response)

SECRETARY KLEIN: Thank you, Mr. Kellogg.

MR. KELLOGG: Thank you, Mr. Chairman.

MR. McKEE: Mr. Chairman, I would now like to call Dr. Harry Boswell of Prince George's County.

STATEMENT OF

DR. HARRY A. BOSWELL, JR.

THE INTERFEDERATION COUNCIL

HYATTSVILLE , MARYLAND

DR. BOSWELL: Members of the Conference:

While I am a resident of Prince George's County, I am here today representing the Interfederation Council. I am a representative of the Interfederation Council, a past chairman and past general counsel of the Interfederation Council.

I think it is important that I first explain what the Interfederation Council is, particularly because a great many statements have been made about what the citizens of this metropolitan area are prepared to do.

The Interfederation Council is the overall organization representing the citizens' organizations of the metropolitan Washington area.

The citizens' organizations are organized first on a local basis. A majority of those local citizens' organizations in turn belong to local federations, and so there are in this metropolitan Washington area local federations in Montgomery County, in Prince George's County, in Fairfax County, in Arlington County, in the city of Alexandria, in Prince William County, and two federations in the District of Columbia, all of which send representatives in turn to the Interfederation Council as an areawide and metropolitan wide forum on the interests of the citizens in the development and growth of the metropolitan area.

Now, I think that first I should like to give an expression of general concern and explain what the nature of the concern of the citizens of the metropolitan area is that might be considered.

First, as a part of our natural heritage, we are concerned about the Potomac River as a part of the great national heritage of this Nation, and we are concerned about our individual stewardship of the natural environment.

Secondly, we believe that the water and the waterfront are absolutely necessary for a blend of passive and active recreation to meet the needs of both soul and body--today and forever.

We must point out that high standards of water quality are absolutely necessary for the poor people we represent in the city to find a satisfactory balance of economical recreation, and this is one of the great lacks in this metropolitan area.

We must also be concerned about the wealthy people we represent today so that they can enjoy their expensive yachts and their luxury waterfront apartments.

We are also concerned about all the people who are in between, so that they might take full advantage of the natural opportunities of the national capital area.

Now, this is not just a recent interest of the Interfederation Council in environmental matters or, indeed, the problems of the Potomac River. I could recite a long history about this, and many of the agencies are aware of our continued concern, but just in relation to the recent concern of the Interfederation Council on the problems of the Potomac River: During 1965 and 1966, we had meetings with various representatives of the Department of the Interior, including the former Assistant Secretary for Water and Power, meeting at our meetings and discussing precisely what might be done both by the Federal Government and locally, and research that was under way.

I might note that we were told in late 1965 that the progress was going to be proceeding almost immediately, but then they said, "Well, we have to follow through on the water standards act before we can really do anything."

So then we started going to work to have a meeting with the Secretary of the Interior, and, through the good offices of Senator Brewster, in May of 1967, we had a meeting with the Secretary of the Interior and were told, among other things, that a conference such as this would be convened within a very few months.

And so we are glad that those few months have now passed from May of 1967, and that we now have this conference under way.

A lot has been said about the funding and whether or not the citizens will be prepared to share in the funding for cleaning up the Potomac River. I think that I can assure you from everything that the Interfederation Council has seen about the needs, and when it is measured in terms of cigarettes per day and so forth, that the citizens are prepared to meet their share of funding.

I might go on beyond this, however, to say that while the citizens are prepared to meet their share of the funding, I think that the special position of the Federal Government in relation to this metropolitan area should be recognized.

H. A. Boswell

I describe this in three different terms:

The first is the general responsibility of the Federal Government over the United States, so we feel that this metropolitan area should have advantage of the general act that has been prepared that relates to the participation of the United States in general terms.

We think that there is a second relationship, and that is the relationship of the Federal Government as a major employer in this area; and in the same way that major employers in other metropolitan areas have a share of the costs of funding various programs of this sort, we think that the Federal Government here should maintain its proper share.

I would like to add a footnote to this. We don't think that such things as sewer pollution and education and a great many other things come from terms of direct contribution to it, so it is not a question of how much effluent does the Federal Government create, though we think sometimes it creates a rather substantial amount one way or another, but we think that there should be a general sharing by the Federal Government in this area based upon its position as the principal employer in this area, the same way that principal employers elsewhere contribute.

But we think that there is a third part that the Federal Government has recognized, and we want to see the Federal Government put its money where its mouth is, and that is that this City should be the showcase of National prestige, that there should be the demonstration relationship.

And so, in the matter of funding, we as citizens are prepared to stand our share, but we want to see the Federal Government stand its share as well.

Now, in relation to the types of programs, the importance of the program and the priority of the program, we have considered these things in various ways over a period of time and have had a great many experts over a period of some years make presentations to us.

Among the things that we suspect are correct is that we find one party saying, "Well, you know the problem is here because somebody else is operating their present facilities improperly," but we think one of the real problems is that the present facilities are not being operated properly and we want to take some immediate steps to see that the present facilities are operating and are operated with concern.

Perhaps we are wrong when we think sometimes people don't have concern, but when we drive down a highway and we see the sludge that has been taken out of a plant and then piled along the highway and allowed to leach and create its odors, to pollute both the air and by its leaching processes to go back into the stream again, we can't really be convinced that there is this sort of concern.

So the first step in terms of the importance of a program and the priority is the proper operation of the present facilities. We think this requires control, and we want to see the sort of overall control to see that no one can say that they are not doing their job on a proper basis because they haven't got sufficient funds to operate their present facility.

Secondly, and I have seen some contrary evidence of this, we think that the separation of the storm and water collectors in the District of Columbia are quite important.

We took a look at some of the figures. I think there were A, B, C and perhaps D programs that were costed on different bases, and the C was finally accepted. I think it was the B that we looked at, because we thought it was probably the minimum it should be, but we saw that the funding of the C was such that while the money kept going into it, the cost of the improvement kept going up faster than the money was being invested in the C program, and so we think this is an important step and one that requires immediate attention.

We think that the construction of new modern facilities should proceed. We do not mean just an experimental plant.

If we really know that part of our problem is removing the nutrients from the water, to put in something that is going to treat three and a half million gallons down in Piscataway, in relation to the area we think is just--well, I had an expression that came to the tip of my tongue, but I had better not express it-- a drop in the rain barrel is about all that is happening from this.

We recognize that continuing research is absolutely necessary, and we want that research to go ahead, but we do not want that research to be the excuse for not doing things at the present time.

In addition to this, we think that sometimes the emphasis upon bigness in this country gets too much, and so, you know, they decide we are going to take all the effluent and dump it all in Blue Plains or dump it all in one place, which we think perhaps is not the best pattern; and so we think whether we do the discharges in a staged discharge coming out of a single plant, perhaps we should put the effluent in places where maybe it can create some good sometimes, because we think the nutrients are sometimes necessary. You know, sometimes if the marshlands dry up in some places, maybe we need to put some nutrients in to supply some of that area.

If we put plants in, as has been suggested by some people at the head of the Anacostia to spread the nutrients out, whether we have the discharge staged in some other fashion, is the sort of thing we ought to be looking into. We ought to know a great deal about where the nutrients might be of some value to the area as well as where they create harm.

Beyond this, and this is a place where sometimes there has been some misunderstanding that I want to clear up right at the present time, the Interfederation Council has been opposed to impoundments unless we were convinced that those impoundments were necessary, but, at the same time, we have said as a footnote to this that if flow augmentation is necessary, and we do not have the present technology to take care of it except by flow augmentation, we want to see those impoundments.

In other words, we want the impoundments as a last resort, if they are necessary, so that we can have a quality in the Potomac River so that people can swim and people can boat and people can sit on the banks without being driven away. If it requires impoundments and flow augmentation to create the necessary job and we don't put them in, then we feel that we are doing less than we ought to be doing.

Finally, let me give you an overview in relation to the needs of the population growth, to the cost and to the benefits.

We think that the population growth in this area is going to create tremendous burdens, but, at the same time, while it creates present and future needs, we think that it creates tremendous opportunities as well.

We don't have to wait for research for what is going on in the future, because no matter how hard we work at the present time, we are going to have a deuce of a time ever getting ahead of the population growth that is going to occur.

This is not just a great national capital, but it is becoming the sort of a great city that we as citizens can be proud of, and one of the ways we are going to be proud of it is because, as it was decided in George Washington's day and in Thomas Jefferson's day, we are going to make the Potomac River the front door to this City instead of the back yard where everybody throws their trash and their refuse.

We want the Potomac River to be a place that people use, not a place that people avoid.

And so, because we are going to have this growth, because we are going to be such a great international center, a center of real attraction, we have no choice. There are no alternatives.

We don't understand what people are talking about when they begin to suggest that a few cents for a day is something that the citizens are not going to be able to afford to pay to see that the Potomac River quality is what we all know it must be.

Thank you.

SECRETARY KLEIN: Are there any questions from the conferees on my left?

(No response)

SECRETARY KLEIN: The conferees on my right? Mr. Jensen has a comment.

MR. JENSEN: One brief comment.

On flow augmentation, we have talked about the need for removing very high levels of BOD and phosphorus, and we are convinced that we have the technology to do this now, but with a rapid growing population that we have in this area, it may very well be that flow augmentation offers a device for getting this last remaining two or three per cent.

We have a mathematical model to help demonstrate this relationship also.

DR. BOSWELL: Let me just say that in Government as well as in the academic world, as well as in the private world, I work with mathematical models sometimes, but I just want to point out something.

Take a look at the chart over here about an analysis that was made in 1965 about the population growth, and take a look at another analysis that was made about the population growth just a few years later.

I ask you not to put your mathematical

models based upon projections of trend, but recognize that this city has reached a sort of takeoff period in terms of what its population growth is going to be.

All of these estimates in the minds of many of us are gross underestimates of what the need is. Some of us suspect that the probability is that because of this tremendous growth in this area, for water resource purposes as well as from the standpoint of the control, that we probably need some further impoundments of the river, but we are not going to define how it should be.

We are just going to say that, let's take a look at all of these possibilities and let's put them together in the whole system to see if the job can be done.

SECRETARY KLEIN: May I ask what your estimate of the population would be in the year 2000, if you disagree with the 7.7 figure that was given yesterday?

DR. BOSWELL: Sir, I would refer you to some testimony I gave before a Senate Committee not too long ago about the danger of making projections like this.

You know, we are working at one side with the pill, and on the other side we are working on how do we increase health standards and how do we make people live to better old age, and when you start projecting populations beyond 50 years, these people are already the pipeline, so you can start to project, you know, how many are going to be 16 years old, 16 years from now.

SECRETARY KLEIN: How about 1980? Have you any projections for then?

We have to do some projecting. We have to have figures, and if you can't give figures, we have got to take somebody's based on mathematical projections. You can't throw the mathematical projections out unless you show where they are wrong and why yours should be taken.

Now, I am just asking you: What projections do you have then for 1980 if you don't want to go to 2000, because we have got to figure for this thing.

DR. BOSWELL: Let me say to you that while I think that Phil Hammer's projection--Hammer, Greene, Siler are very capable people and I think that their projections for 15 years from now probably aren't going to be too bad--I think they are going to be on the low side, but not too bad.

Now, part of this is because a great many people from Illionis and other places are moving into this area all the time.

SECRETARY KLEIN: Some of them are going back to Arizona.

DR. BOSWELL: And if somebody can project who the President of the United States is going to be four years from now or eight years from now, my projections would be even better, but I am not going to predict on who the President is going to be four years or eight years from now, or exactly what the population is going to be.

SECRETARY KLEIN: Let me ask you another question--

DR. BOSWELL: But I think that there is something that relates to this question and the scale that we are talking about.

In other words, I am talking about an additional ten per cent on top of Phil Hammer's figures. The scale we are talking about is far beyond anything we are talking about in terms of our projection of taking care of the sewer needs to clean up the Potomac River.

SECRETARY KLEIN: That is what we are getting at.

How do you plan for the future? You have to have some figures to go to.

Let me ask you this question: You said there was sludge along the highways. When and where?

DR. BOSWELL: Well, let's say Blue Plains. If you pass down the Anacostia Highway, you will see why we call it Blue. You have an aroma that comes out of the piles of sludge that are there and they are very easy to see.

SECRETARY KLEIN: Well, aroma can't be seen, it can be smelled, but that is all right.

Mr. Jackson, would you like to reply to that?

MR. JACKSON: Mr. Chairman, we need to wait 30 to 45 minutes before eventually it gets back to Blue Plains.

What we are talking about, I think is the wind-rolling of our sludge that is removed from our sewage treatment procedure.

A method of doing this is to mix this sludge with excavation dirt that we ourselves excavate in the digging of trenches in the conduct of our regular business of building sewers and water lines, and also the acceptance from other areas of waste excavation dirt.

We mix this together, we hold it over a certain period, and release it only over the fall and winter period, not over the summer period.

This provides a very good top drawer dressing which a good many people, including the Department of the Interior and its national capitol parks, as well as other individuals in the area find in traveling along the highways.

We plan to use this material before too long to try to dress up a top covering for the Kennelworth Sanitary Landfill when we have finished filling that with solid wastes.

With this kind of use, we could find a good way to get rid of this material and use this as a method of disposal of it. We find that if we keep it there a year--I am not sure in the past whether you have passed it in the last year or not, sir--

DR. BOSWELL: I have.

MR. JACKSON: Have you? Well, my answer won't hold there then.

DR. BOSWELL: In fact, last September it was extremely interesting.

MR. JACKSON: I would point out, Mr.

Chairman, we are not dealing with basically the most desirable type of odorous material.

SECRETARY KLEIN: We could if we got everybody constipated for two weeks. (laughter)

MR. JACKSON: But I might also point out that last summer we were trying to master this in an odor control program and had actually, as I recall, some mastering material being stored over that pile.

So, we are trying to be good neighbors. I am sorry; maybe the wind was just two or three degrees out of the right pattern.

SECRETARY KLEIN: I think you should have a conference with Mr. Vincent Bacon.

DR. BOSWELL: I think that there has been some improvement in this area.

SECRETARY KLEIN: Fine.

MR. JACKSON: Thank you very much, sir. I think those are the kindest words I have heard in the last two days.

DR. BOSWELL: Mr. Chairman, after saying that--

SECRETARY KLEIN: Please. I have four others to go and I have two questions to ask of you. I would rather start cutting it short.

Now, you represent a good many people in this area. I have some ultimate questions for you.

What results do the citizens belonging to the Interfederation Council want in the Potomac?

DR. BOSWELL: Well, our most recent statement on this has to do with the water quality standards hearings, and at those we, among other things, of course, objected to the--

SECRETARY KLEIN: All I want from you is the answer to the question, not what you did there.

What is it today that you want in the Potomac as the result?

DR. BOSWELL: Mr. Chairman, you know I sympathize with your wish to get direct answers, but I think my answers are quite direct when I was getting ready to state what we said with relation to the water quality standards, because this was a direct statement.

We agreed with all the water quality standards that had been suggested, with several exceptions.

One of these exceptions has since been by the Department of the Interior somewhat raised, and this was the exception that had to do with the quality of water where the Potomac River left the District of

Columbia into Maryland.

And so, with the water quality standards as they are presently accepted, as they are promulgated, we are prepared to accept them.

SECRETARY KLEIN: Would you be willing to pay for the results of going to 96-98 per cent removal that was put forth here yesterday, with nitrogen and phosphorus removal, in the sanitary district plants of this area?

DR. BOSWELL: Within the frame of reference that I gave within my talk, that is correct, within a proper sharing.

SECRETARY KLEIN: Since your groups are producing the pollution, are you willing to pay for reducing it back to almost good water again?

DR. BOSWELL: Within the pattern of proper sharing of funds, yes.

SECRETARY KLEIN: Well, you see, the Federal Government is paying everybody's salary around here one way or another.

DR. BOSWELL: It is really surprising who pays the Federal Government's salary, sir.

SECRETARY KLEIN: I used to say that, too.

I used to say that, too, as a practicing attorney.

DR. BOSWELL: Well, I hope that you continue to preach what you used to practice.

SECRETARY KLEIN: Thank you very much.

DR. BOSWELL: Thank you, sir.

SECRETARY KLEIN: Mr. McKee.

MR. McKEE: Mr. Chairman, I would like to call on Mr. Ivan Sims. We have called him three times before and he is here now. Mr. Ivan Sims of the Izaak Walton League of America.

STATEMENT OF
MR. IVAN H. SIMS
CHAIRMAN, INTER-DIVISIONAL COMMITTEE ON THE POTOMAC RIVER BASIN
IZAAK WALTON LEAGUE OF AMERICA

MR. SIMS: Mr. Chairman, ladies and gentlemen:

I apologize for my not having been present when called before.

I am Ivan H. Sims. I am a resident of Montgomery County. I am also chairman of the Izaak Walton League of America's Interdivisional Committee on the

Potomac River Basin.

In addition to my position there, I have been authorized by the Chapter President to represent the Bethesda-Chevy Chase Chapter of the League, and speak for it. I am a member of that chapter.

The Interdivisional Committee is made up of representatives of the League's State Divisions for Maryland, Pennsylvania,Virginia, and West Virginia, the four States having a direct interest in the Potomac River Basin. The Committee is interested, of course, in all matters concerning the basin, not the least of which is pollution and its abatement and control.

The Izaak Walton League has been fighting for clean, usable waters in our streams, lakes, and estuaries for 45 years. In the early years, the 1920's and 1930's we suffered a great deal of criticism and no little ridicule for our efforts. This has now changed, but the growing support for pollution abatement and elimination has not diminished our interest or efforts to wipe it out completely; how soon we do not know, but we hold to that as our end goal.

When I prepared these remarks, it was without the benefit of knowing what had been said here in the last two days, but I think our end goal fits in perfectly with what the chairman has been asking for: would we support treatment measures which would eliminate 96 per cent or more of the BOD and of the nitrates and phosphorus content of sewage effluent? I think I can speak for the League in saying that we would support that objective and the measures that are required to attain it.

Now, Maryland has a vital and special interest in the Potomac, and so Maryland's standards for the quality of the water in the river have a direct bearing on the subject of this conference. Our Committee, and the Chapter, endorse Maryland's standards for the River generally as being realistic and entirely attainable in the light of present attitudes, conditions, and technology. We think they are enforceable and urge, for the good of the people in the basin, that they be enforced to the fullest.

Under Maryland's standards, water of good quality would be delivered to the users of the Metropolitan Washington area. We think the District of Columbia and its satellite suburbs are entitled to that.

We insist, however, that the Potomac River Estuary is entitled to receive water at least as good in quality as that delivered to the metropolitan area and the District of Columbia. Enforcement of Maryland standards above the District and Metropolitan area is going to be painful and expensive for the communities and industries in the upper basin. We feel that other jurisdictions which share the river must assume their share of the responsibilities, costs, inconveniences, and hardships if necessary, to return the water to the estuary as they receive it, or better.

Pollution control in the Washington Metropolitan area is a peculiarly Federal responsibility. In addition to the interstate aspects, including the fragmentation of responsibility for operation of treatment plants by many jurisdictions, Federal responsibility for the District of Columbia is direct and almost exclusive. We feel, therefore, that the Federal Water Pollution Control Administration has an unusual and special role to play in this area. We believe it should be specially aggressive here in exerting its influence and meeting its responsibilities.

The proposal to use the estuary as a source of emergency water for the District is receiving considerable support, and our Committee is in favor of giving the proposal intensive scientific and engineering study.

This should give particular attention to the likelihood that such use would lead to repeated recirculation of the water as the emergency use inevitably becomes so frequent it grades into regular use, and the consequent rise in the nutrient content of the upper estuary. The present level of nutrients is directly related to the algae problem and any increase in eutrophication could only intensify this and perhaps other problems. The proposed study of the use of the estuary should therefore deal exhaustively with the possibilities for using distillation or other methods that would not only render the estuary water biologically ready for return to the mains, but also to salvage the nutrients, nitrogen and phosphorus for conversion to fertilizer. Unless the nutrients are removed and prevented from returning to the estuary, the whole pollution control feature of the plan would inevitably be defeated. This may well be the really crucial issue in the use of the estuary as a water supply, temporary or permanent. And if fresh water can be reclaimed from seawater we cannot accept a negative attitude on application of the principles to prevent destructive enrichment of the estuary.

Mr. Chairman, the Interdivisional Committee on the Potomac River Basin is not a technical or engineering committee so we will not presume to make specific suggestions on how the objective of pollution control and elimination is to be achieved. It is a common charge, these days, to say that if these United States can afford to send men on round-trip excursions to the moon, and for ten-day visits to outer space, we can certainly afford to do a lot of socially desirable things at home here on earth. Some even proposed that the cost of the race to the moon could better be spent on our cities and on their people, and on our environment.

Certainly, we are getting mighty tired of hearing that the cost of pollution control is reason enough for procrastinating on the program. For the cost of one of those manned skyrockets and its recovery we could build a distillation plant that could supply the entire Washington area with the purest possible water.

Mr. Chairman, I thank you for this

opportunity to present the views of the Interdivisional Committee of the Izaak Walton League of America and its Bethesda-Chevy Chase Chapter.

I would like, if I may have about another half-minute, to object strenuously to the proposal which was made about the flow augmentation business.

For years and years, the Izaak Walton League has said over and over again that dilution is not the solution for pollution, and it still is so.

I don't like to see the people talk about determining the functioning of the estuary to assimilate pollution. That is not a function of an estuary, to assimilate pollution, and I don't like to hear someone talk about allocating the permissive pollution which the estuary could absorb amongst jurisdictions.

We want to get rid of this pollution, and I think you agreewith us, if I understand the questions you have raised with some of the previous speakers.

Now, one more thing: They are always bringing up this matter of the cost, and the spokesman for the Washington Suburban Sanitary Commission raised the spectre of costs and whether the people would stand for it.

Montgomery County has the dubious reputation of being the wealthiest county in this country, and if anybody wants to stand here and ask me do I think that the people of Montgomery County would stand another 30 cents a day or 50 cents a day to clean up their pollution, I think I can say they would. They spend that much and more for a lot of other projects which don't return quite as much benefit.

Thank you.

SECRETARY KLEIN: Are there any questions of Mr. Sims from the gentlemen on my left?

(No response.)

SECRETARY KLEIN: On my right?

(No response.)

SECRETARY KLEIN: Thank you. I think you understood my questions correctly.

MR. McKEE: Mr. Chairman, I would like now to call Mr. Robert Straus, Executive Vice-President of the Accokeek Foundation.

SECRETARY KLEIN: I might say at this time because of the program we still have left for tomorrow, we may run a little bit later tonight than I had originally intended to do, and I would appreciate your bearing with me.

Mr. Straus.

STATEMENT OF

MR. ROBERT WARE STRAUS

EXECUTIVE VICE-PRESIDENT

ACCOKEEK FOUNDATION, INC.

MR. STRAUS: Mr. Chairman and gentlemen:

In view of the lateness of the hour and the length of the speeches, and in view of the fact I understand that all the panelists have learned to read, I am going to cut my remarks shorter.

SECRETARY KLEIN: I appreciate that.

MR. STRAUS: I call upon myself as the only river commuter in Washington, and I probably have more contact with the river than anyone else here.

SECRETARY KLEIN: Don't make it direct.

MR. STRAUS: It is direct.

We have all been struggling with the problem of increasing pollution of the Potomac River Estuary for 28 years.

As the only river commuter, I probably have as much daily contact with this great natural resource as anyone in the area. I am keenly aware of its continued deterioration. My daily boat trips keep me aware of whether or not the sewage plants along the upper estuary are operating. I am also aware of the tremendous efflorescence of algae in the summertime.

As a preliminary, I should observe that the sewage plants at Blue Plains, at Piscataway (although that plant was finished only a few months ago) and the others along the upper estuary are built to the standards of 1900. At any breakdown, there appears to be no backup and the plants do not operate. The "relief valves" which are built into the influent of the plants are put there to operate--to allow sewage to be discharged. The result is raw or poorly treated sewage in the river.

Therefore, my first recommendation to this group is that sufficient standby facilities be put into the plants now operating, so that they will operate, and that standard maintenance does not call for shutting down the plant and letting sewage flow raw into the river.

This type of "fail safe" operation is now installed in our chemical plants, our water plants, aircraft, automobiles and many other types of facilities. It is time that sanitary engineering facilities caught up with the rest of the world.

Now I would like to qualify myself a little further with the following statement on rivers and estuaries.

For a quarter of a century, I served as Consultant to the Interstate Sanitation Committee in New York, New Jersey and Connecticut. During that time, I gained considerable acquaintance with estuaries, pollution control and river management.

Based on this, I will make my recommendation for a method of water quality management based on a system of allocating the assimilative capacity of receiving waters, applying thereto the concept of equitable apportionment, and establishing a reserve which considers the time needed to complete a pollution abatement cycle in the estuary.

In the 28 years I have been interested in the Potomac Estuary, the public interest in the waters has broadened tremendously. Originally a water user had to prove he was damaged. Since then, water courses have come to be considered to be in the putlic interest. This is expressed through the water pollution control laws of very recent years. These public interests usually include public health, animal and aquatic life, regional agricultural and industrial uses of the water body. It is important to note that we should protect not only the present uses but look to the future uses as well.

The first step is to determine the uses which should be protected. The next step is to determine the associated water quality criteria which are necessary to protect those uses. The next step thereafter is a control plan. This requires a mathematical model which simulates the assimilative capacity of the stream. This means the ability of the body of water to assimilate waste without violating the established water criteria. In establishing models, it is necessary to divide the estuary into zones. The assimilative capacity can then be budgeted separately for each zone.

While I recognize that a mathematical model for the river has been established, to the best of my knowledge no system of allocating the assimilative capacity of the river has been set up and implemented. This is essential if we want to make progress in what appears to be a losing game.

I am quite sure that all the technical experts here will recognize that zones from the upper end of the District of Columbia at least down as far as Mount Vernon are badly overloaded and have little or no assimilative capacity at the present time. Below that area, we still have a stream quality which is not totally debased. Each will have to be handled in a separate manner. Thus it will be necessary to devise a plan for wastewater disposal in the estuary which takes all of the factors listed before into consideration. It may be necessary to engage in some transfer of waste discharges from one zone to another for reasons of economy and for proper development. However, these shifts and allocations should only be allowed if the shifting attains an improvement to both zones. The solutions, of course, should be cost minimizing, while at the same time, maintaining stream quality.

Thus, it can be seen that the recommendations made by the Accokeek Foundation are the abandonment of the present system calling for a percentage of BOD removal standard for each plant in favor of a system of allocating a specific number of pounds of BOD per day. As the population shoots up, the present plan will result in deterioration even if the plants are properly operated.

This brings us to our last point.

Unfortunately, the actual policing of the quality of the effluent of the plants seems to have devolved on the untrained citizen in many cases. The agencies charged with maintaining the standards are not equipped to do this work and must depend on reading the daily press to find out if the plants are meeting the standards.

It is our second recommendation that in this day of automatic monitoring, that such devices be placed in the effluents of the plants and that this reporting be done so that it can be scanned rapidly by technicians responsible for enforcement.

Data and pounds of BOD and phosphorus allowed to be discharged to each zone and actually discharged should be publicized regularly.

As our third and final recommendation, we request that the limits of the Federal enforcement conference at this conference here today be expanded from the metropolitan area to cover the entire river from its head waters to Chesapeake Bay and that a much more adequate budget be provided to monitor the river and carry out the abatement program.

In view of the predominant Federal presence in this basin, it is essential that Federal enforcement leadership be called in to do this task.

If we really want a "model" river, we need action, not more reports.

There is one other factor in the earlier part of this which I cut down which had to do with redesigning and establishing standards for the plants on a fail safe basis.

I happen to be in industry where we have to design the plants fail safe, and I believe still the standards of the sewage plant are not fail safe. With any breakdown you close down the gates and let the sewage flow raw into the river. I see that every day going up and down the river, so I am thoroughly familiar with the problem.

That concludes my remarks.

SECRETARY KLEIN: Thank you very much, Mr. Straus.

Are there any questions from my left?

(No response)

SECRETARY KLEIN: Any from my right?

(No response)

SECRETARY KLEIN: I would say to you, sir, that if you look at the report, it calls for 96 and

98 per cent with the total load, so that it has both of them in there for two different reasons and they work together.

If we put a certain point of efficiency on this, then we know we are reducing the load.

MR. STRAUS: That is correct.

SECRETARY KLEIN: And the question is will it get down that far?

Thus far, our projections are that this will bring it down that far. It may be that in total operation, if we started this right now, the growth of population in Washington would still put it over that amount of load, but at least we have made the significant step toward it.

Therefore, I would say to you, be very hesitant about throwing out these efficiency items, but use them as a tool towards the final analysis.

MR. STRAUS: I agree with that. I think backed by actually a number of pounds of BOD which can be discharged, they will work together.

SECRETARY KLEIN: Yes. Well, we have to match them in total discharge of 16,500 pounds per day.

MR. STRAUS: Fine.

SECRETARY KLEIN: That is in the recommendations on page 9, the No. 1 recommendation.

MR. STRAUS: Fine. We are in agreement then.

SECRETARY KLEIN: But it is tied in, because you have got to have someway to get to it, and this is the only way today that we know exactly how we can get there and at least approximate it as to what our projections are.

MR. STRAUS: Let's go.

SECRETARY KLEIN: Great. We are hoping. All you have to do is get the people behind us, and we are on the way.

MR. STRAUS: What people?

SECRETARY KLEIN: The Washington Suburban D.C., Virginia and Maryland. They will start it tomorrow if you can get the people behind it. That's it.

MR. STRAUS: I believe the people, at least in our area, are behind this, very much so.

SECRETARY KLEIN: Fine. Are there any further questions, gentlemen?

(No response)

SECRETARY KLEIN: Thank you, Mr. Straus.

MR. McKEE: Mr. Chairman, Mr. Julian Holmes will make the next presentation.

STATEMENT OF

MR. JULIAN C. HOLMES

PRESIDENT

CITIZENS' ASS'N. OF FRIENDLY INC.

MR. HOLMES: My name is Julian Holmes. I speak for the Citizens' Association of Friendly, a community in southern Maryland, about six miles south of the District.

As one who has fought land use pollution in suburban Maryland, I am pleased that the Potomac River is the subject of a conference. But I am dismayed that the same State and local public officials who ignore land pollution are often those responsible for water pollution.

I hope that this conference will reject the pollution thesis which currently enjoys popularity with Maryland Health Department officials. This thesis proclaims that pollution of land and rivers is a necessary evil which private citizens are not equipped to understand or discuss. I call this the Maryland Syndrome.

The Maryland Syndrome incubates in the

smoke-filled chambers of local zoning czars. It first manifests itself in decisions to zone land in a manner that will bring the highest financial return to friends of the decision makers. The resulting pollution of land is exemplified by the Maryland landscape across the Anacostia River from our Nation's Capitol.

This untrammelled growth experienced by local Maryland suburbia brings problems to those who deal with pollution of our water supplies and rivers. Solutions for these difficulties do not come easily, and this speaker is not saying that our officials have always taken the wrong point of view. I am simply suggesting that our Maryland Health Department has no point of view. The Maryland Syndrome obviates the need for any point of view at all, and this goes for the Washington Suburban Sanitary Commission also.

As a participant in the continuing battle to clean up the now grossly polluted Potomac River, and this is where most of my vacation time has gone in the last nine months, I find that the Syndrome has infected both the Prince George's County Health Department and the State Health Department to the extent that meaningful communication between local residents and officials is rare indeed.

With local Health Department officials now enmeshed in septic tank permit scandals, there is little time to consider the serious local problem of pollution of our streams and river.

At the State level, the Syndrome has decimated the forces of conservation. It has left a State Health Department anti-pollution policy that is somewhat uncomfortably allied with the conservation policy of the real estate interests. Pollution control is to a large extent in the hands of the developers.

To illustrate how the Maryland Syndrome has crippled our defenses against pollution, I shall review briefly the saga of the "Model Sewage Treatment Plant" at Piscataway Bay on the Potomac, just across the River from Mt. Vernon.

Against the recommendations of local officials and citizen organizations, the Washington Suburban Sanitary Commission built a sewage disposal plant on historic Piscataway Bay. Sanitary Commission news releases billed the project as a pilot plant where research would provide the plant with the most modern tertiary sewage treatment available. This modest five-million gallon facility would serve as a "Model for the Nation", and its design would be copied at large regional sewage plants.

The Piscataway Plant began its treatment of sewage in late 1967, a year behind schedule. Its effluent line was never built, and the effluent was discharged into an open field and left to find its way to Piscataway Creek over one-quarter mile of open meadow. Raw sewage was dumped into the Creek, and sludge "accidents" were common. The water was befouled with floating sludge and noisy bubbling. The odor was offensive.

I would like at this point to put these pictures into the record.

The first one shows the way sewage leaves our model sewage plant that is to be a model for the Nation. It makes a big gorge through what was a country pasture.

The second photograph shows the kind of plants which grow at the output of the sewage plant. They are quite unmistakably tomato plants.

This shows the surface of the water in Piscataway Creek where the Washington Suburban Sanitary Commission put the effluent from this model sewage treatment plant which was to be a model for the Nation.

Local residents complained but received little sympathy from officials. The Sanitary Commission denied knowledge of sewage and sludge dumpings. It was left to the residents to bottle the dumped sludge and lead State Health officials to the scene of the carnage.

Overwhelming evidence produced by local citizens forced the State Health Department to order the overflowing overloaded Plant to stay within its rated capacity of five million gallons per day.

But not for long. The Sanitary Commission, local developer interests, the County Commissioners, and the State Health Department reached a concensus. The Plant wasn't doing so badly after all, and the sewage flow should now be allowed to exceed design capacity by 60 per cent. Plans were laid to increase the size of the plant from 600 per cent to 3000 per cent. Yet not once has the Health Department informed the public why no tertiary treatment construction contract has been let for the Piscataway Model Plant.

All that is heard from our Health officials is that the Piscataway facility could not possibly pollute the Potomac River. Effluent quality standards quoted are from the last Conference, eleven years ago.

Citizens are maligned for their efforts to promote effective action.

It's a pitiful, tragic story of official failure to police violations of the public trust. These details will be made a part of the record at the Congressional hearing to be held on the Piscataway Plant.

But one final illustration is in order. I had lunch last week with one of the previous speakers here today. He is the Deputy Chief Engineer at the Washington Suburban Sanitary Commission. He asked me why I was so interested in the Potomac River. I replied that I was concerned with the severity of its pollution. His reply was, "Well, what else would you use it for?"

Gentlemen, the Maryland Syndrome is real. The Potomac River will remain grossly polluted as long as this kind of thinking is allowed to waste the time of those who are trying to help.

Effective standards and scientific enforcement are the answers. The cost of a clean river will be high, but I firmly believe the public will think it worthwhile.

Thank you.

I would like to add, if I might, a couple of comments on what has been said here today.

The State Health Department's statement mentioned that the enlarged Piscataway Plant is scheduled for expansion in the near future and that it will provide an even higher degree of treatment than that required to meet the water quality standards.

I think everyone here knows that that statement is just absolutely false. There are no plans, no contracts proposed to be let for any other kind of treatment at this plant other than the type of treatment, the standard secondary treatment, that is used now at Piscataway and at Blue Plains.

I also think that it is unfortunate that the State officials are using the Federal Government as a whipping boy in this problem.

The State Health Department has said that they can't put a line out to discharge their sewage into the river because the Federal Government has been the block in the way. This is, of course, absolutely false.

The Federal Government offered the Sanitary Commission a permit to put the line over Federal park land and the Sanitary Commission turned it down.

This statement, I believe, was repeated by the Sanitary Commissin's spokesman here today, and it is no more true there than it was coming from the State Health Department.

That concludes my remarks.

MR. STEIN: Are there any comments or questions?

MR. McKEWEN: I have a question.

Mr. Holmes, the last statement you made or the next to the last about the offer of the National Park Service to permit an effluent line across their property to the Potomac and being turned down by Washington Suburban, could you amplify that or clarify it?

MR. HOLMES: Copies of those documents will be placed in the record of the congressional hearing, but I am referring to the permit which was issued by the Department of the Interior to the Washington Suburban Sanitary Commission, the only permit that I am aware of that has been issued.

MR. McKEWEN: I wonder if we can call upon Dr. Machis to see whether or not there has been such a permit known to him.

DR. MACHIS: We have been trying to get

a permit to build a line through the National Park Service for possibly six or seven years.

I don't recall the exact date, but Mr. Holmes has gotten copies of this from our office and I am sure he has the documents in hand and can quote them. I don't have them with me. I would like to read it to you if I did.

Several years ago, we did receive the conditions placed upon a permit for crossing the Park Service land. Included in these conditions were a number of items to which the Commission took exception.

One of these was that we put up a half-a-million-dollar bond, as I recall, to guarantee to the Federal Government that the public agency, the Washington Suburban Sanitary Commission, would discharge effluent which at that time and today considerably exceeded the water quality standards of the State of Maryland.

As a matter of fact, the water quality standards were such that at that time no one knew that we could practically achieve these.

We did say that we would be perfectly willing, and, as a matter of fact, pledged money to build a tertiary plant as a demonstration to demonstrate what could be achieved by sewage treatment of a tertiary nature, and to date, the Department of the Interior, just as I stated earlier, has not taken up and assured us of its pledge to share in that cost as they originally told us they would.

This is the status of it at the moment. We are continuing to pursue an effort to get a park permit to put the sewage effluent into the river, where everybody knows it really belongs, and get it out of the Piscataway Bay, where nobody, not even the Sanitary Commissioner said yesterday from this podium, wants to put it.

There is no question in anybody's mind but that it is the proper thing to do to put it in the river, and I think there is no question at all that the Health Department of Maryland will require that the sewage be treated to meet the water quality standards of the State.

There is no question at all that the Piscataway Plant can do this and it is doing it. However, we still don't have a permit to reach the river.

It appears that the National Park Service and the Department of the Interior feels that it should apply some sort of quality standards which, of course, are in the prerogative only of the State of Maryland for its water quality standards as approved by the FWPCA of the Department of the Interior.

However, we have not been successful in getting a permit of this nature to get through this park and discharge the effluent where it really deserves to be discharged.

SECRETARY KLEIN: May I ask you a question? How did Piscataway Bay get polluted? Wasn't it the discharge from the sewage treatment plant that pollutes it?

DR. MACHIS: I don't know that Piscataway Bay got polluted from that plant. There were many things discharging into Piscataway Bay. There is Andrews Air Field discharging sewage effluent there. They were there long before we were.

SECRETARY KLEIN: If you are not polluting--

DR. MACHIS: Wait a minute now.

SECRETARY KLEIN: Please. If you are not polluting the Bay, then it doesn't make any difference if you discharge into the Bay or the river.

You will either have to solidify your arguments on one side or the other, or you are trapped on the horns of a dilemma.

DR. MACHIS: May I finish what I started to say before?

There were a number of privately constructed sewage treatment plants which were discharging into the bay, possibly three or more, and there are some school treatment plants discharging into the bay.

The Piscataway Plant was designed to intercept and eliminate all of these points of discharge, which were, of course, of a lesser degree of treatment than the Piscataway Plant, and carry them out into the river, rather than discharge them into the bay.

I think the Piscataway Bay, if it has been polluted, has been polluted for years in advance of the Sanitary Commission's plant, which, I suppose, being of a higher quality and doing a better job of effluent treatment. I think has probably reduced the degree of pollution occurring in the bay actually, and we would like to continue to reduce it by taking all of the effluent out of Piscataway Bay and putting it into the river where you have considerably more water that can assimilate what the plant does produce.

SECRETARY KLEIN: I may point out to you,

you just lost your argument to go across National Park land, because you said you are reducing the pollution in Piscataway Bay because of your type of operation. You got caught on the horns of a dilemma on this one.

You have to take one choice or the other. Either you have to do it one way or the other way, and now you are trapped.

Thank you.

Anything further?

MR. McKEE: Mr. Chairman, I would like to call on Mr. James B. Coulter of my own State Health Department at this time.

STATEMENT OF
MR. JAMES B. COULTER
ASSISTANT COMMISSIONER
FOR ENVIRONMENTAL HEALTH SERVICES
MARYLAND DEPARTMENT OF HEALTH

MR. COULTER: Mr. Chairman, my name is James B. Coulter.

I welcome the opportunity to participate in this conference.

I wish that I were not in the position of following Mr. Holmes. He is a very capable adversary. He has driven that point home in several meetings and engagements. Nor do I want to respond in an argumentative way to the questions about Piscataway Bay.

I would point out that we have a syndrome in the Health Department. It is a syndrome that is based on three precepts.

First of all, the people of the State of Maryland must be served with adequate sewerage service.

Second of all, that service must protect the health and the sanitary conditions of the area in which the people live.

Third of all, that service must enhance and protect the water quality of the State of Maryland.

I believe, Mr. Chairman, that you asked the question how Piscataway Bay got polluted, and I think that the answer is quite obvious.

Piscataway Bay got polluted from the discharges ofraw and inadequately treated sewage, and that pollution was prolonged and intensified by the local controversy surrounding the building of what is now the Piscataway Sewage Treatment Plant.

I think it is safe to say that adequate sewage service in that area was held up for some time while the controversy went on about whether a plant should be built on the banks of the Potomac River or not.

I join with those who rejoice in the fact that a sewage treatment plant was not built across the Potomac River in view of Mt. Vernon.

I think it is to the credit of Maryland and its citizens, and certainly to Mr. Holmes and his organization and the Accokeek Foundation and others who have fought to preserve that shoreline, and I think it is to the credit of the counties and the people served by the Washington Suburban Sanitary Commission that the plant was relocated, and relocated with assurances from the Department of the Interior that there would be cooperation in providing an outfall line to the Potomac River. Based on those assurances, the sewage treatment plant at Piscataway Bay was built.

There is not now permission from the Park Service to go across their land with an outfall line which would carry the cleansed sewage to the Potomac River. If there were that permission, there would be no reason for this congressional investigation that has been talked about in the papers and mentioned here by Mr. Holmes, but for which none of the official agencies have yet had any announcement or any notification.

Mr. Chairman, I would like to leave this rather trivial discussion of Piscataway Bay and get to the major issues of this conference.

The major issue is: Is the Potomac River polluted? And are we doing what reasonably should be done to prevent that pollution?

I think on the first question that the conferees must conclude, and I certainly will prevail upon the conferees if I am given the opportunity, that the Potomac River is polluted. It is far from a showplace of the Nation that it should be.

That is not a unique position. I believe that the record of the 1954 conference and of the 1957 conference will show that that conclusion was reached.

I think further, Mr. Chairman, that a review of those conferences and of what has been said here today would show that there are a number of things that can be done to eliminate that pollution, and I believe that we all think that they should be done forthwith without delay.

The first of these is to eliminate the discharge of raw sewage into the Potomac River.

J. B. Coulter

We have heard of the difficulties and appreciate the difficulties of separating a storm and sanitary sewerage system, one that is permitted to grow as a combined system.

We have some experience with this because in 1912, Mr. Chairman, the city of Baltimore, with its own money and its own citizens, tore up the streets of that city and separated the storm and sanitary sewers, and at that time they did put in what then was the most modern sanitary treatment in the world.

I wish that they had continued that rate of progress. There are other sources of raw sewage, though, other than those that we normally associate with a combined sewer system in the District. These too often are the intermittent discharges from sewers that become clogged, sewers that become ruptured because of vandalism, sewers that for one reason or another, even though they are designed to collect and transmit sewage to a cleaning plant, are permitted to spill.

I want you, Mr. Chairman, and the other conferees to know that Maryland has an active program to strengthen our sewer surveillance so that we can eliminate these sewer spills, and whenever these come to our attention, we take prompt action to see that they are eliminated.

This includes orders to the Washington Suburban Sanitary Commission, for instance, to actually go to overflowing sources and pump those sewers out, and, by truck, carry the liquid to a designated point so that it will not pollute the land.

But I think that there is quite a bit that we can do to eliminate raw sewage.

The second thing that we can do, and again this is not new--it has been brought up time and again--is that we can improve the operation of wastewater treatment plants.

Mr. Chairman, you and this conference might do the public a tremendous amount of good if you would carry the message that these are pollution prevention facilities and that they are not the sources from which pollution originates.

In the case of Piscataway Bay, some 92 per cent of the pollution that was going into Piscataway Bay is being cleansed as a result of that plant being built, and we are not through. We will improve it.

The third point is: How shall we use the assimilative capacity of the Potomac River?

Frankly, I don't think we should use it. I have been under heavy pressure from many sources, but the most vicious pressure comes from citizens' groups, it comes from Mr. Holmes and people of his bent who want to help but bring strong pressures on us to do the wrong thing.

Mr. Chairman, it is not our goal in Maryland to meet the water quality standards. The water quality standards in Maryland represent the minimum level of water cleanliness that is acceptable.

In Maryland, we are designing sewage treatment plants and carrying out our regulations to remove as much of the filth and as much of the waste as possible at the cleansing points.

Now, Piscataway Bay does make a good illustration. You have had presented to you here a mathematical model. This is one of perhaps four mathematical models that have been developed, and it is an excellent model and it does give the administrator the ability to predict what his actions will result in.

If you will look at the map behind you and think in terms of the mathematical model, a pound of sewage treated and discharged in the metropolitan area has 100 times the effect on the dissolved oxygen of the Potomac River that the same pound of sewage treated to the same level at Piscataway has.

Now, I would suggest that we not ignore this, but that we do, as some people suggested, use it, but, above all things, do not use the model to allocate the amount of pollution that should go to each stretch of the stream.

I suggest that the plants in the Washington Metropolitan area, at least on the Maryland side of the river, be tied together in an operational system.

We are right now picking up sewage from the Henson Creek area and pumping it to Blue Plains, and this is probably the worst technological thing that we could do.

We should, with all speed, increase both the capability and the capacity of the Piscataway Sewage Treatment Plant to handle the growth of the Piscataway drainage area, but also to give the administrator, the control agencies with their syndrome complex, the flexibility to transmit sewage in times of stress from Blue Plains to Piscataway, where again, given the very highest degree of treatment, it could be discharged, and take much of the stress off the critical stretch of the stream.

In that system eventually we visualize that a sewage treatment plant will be built just slightly below our area now. With the growth that we have, it would be possible to interconnect a network of collecting systems and operate those three plants in much the same way that electrical generating plants are now used, again not to use up the capacity of the Potomac River or dirty it down to any preconceived level which we might call water quality standards, but simply to keep that river as clean and pretty as possible.

Finally, Mr. Chairman, my fourth point is that in spite of everything which water pollution control officials might do, it has been obvious to a great number of people at least who have studied the Potomac River that you will not have at all times a clean Potomac River unless the main stem of that river is captured and worked on just above the Washington Metropolitan area.

Now, this, unfortunately, just gets caught up in a number of cliches like "Pollution is not the solution to pollution," or whatever way that thing goes.

I think that the model will show that

there is very little advantage from augmenting the flow through releases at low flow from a reservoir up there, but I think the model would also show and common sense would indicate that if the main stem of the Potomac River before it came into the Washington area could be manipulated and worked on, we could do such things as trapping silt before it got into the Washington area, we could trap debris before it got down onto the shores of our Capital, we could trap nitrogen and phosphorus and cause it to be expanded up there rather than transmitted down to the estuary, and, finally, we could satisfy much of the residual BOD and bacteriological load that comes into the Washington area.

Mr. Chairman, I think that all four of those points can be accomplished with the technology and with the science that we have, and the only thing that has stood in the way of making these four major objectives starting back in 1954 when the conference was first convened has been the lack of priority in the District of Columbia, in the Appropriations Committee of Congress, in the places where money is made available, to make the resources available to do the major job that has to be done.

I maintain, and I am sure I am right, that unless immediately we place a priority on this program, to demand the appropriation needed to do the first simple work, that we will be back in still a fourth session of this conference some ten years from now.

I would like to close by adding that there has been considerable discussion of nitrogen and phosphorus and whether it should be removed or should not be removed at this point.

Within the State of Maryland, we have requested Washington Suburban as well as some of our installations on the Patuxent River to remove phosphorus and nitrogen.

We have predicted what the results will be and we have confidence in our predictions. Engineers are right now designing those processes into the plants.

Removing nitrogen and phosphorus will not be without penalty. I am not talking about the cost. The cost will roughly double the water rates of the people using the system, and certainly I believe that our citizens are willing to double their rates.

But there are problems like sludge accumulation. You have heard testimony of how the sludges accumulate in the Blue Plains now. The present techniques under consideration would double that sludge load, and it would seem that common sense would indicate that we solve our problems one at a time and that the major solution here would be to find a dependable way of ridding ourselves of the filth when we remove it from the sewage before we add a major factor to that load.

With that, Mr. Chairman, I conclude my extemporaneous remarks and lay myself open with my syndromes to those who might ask questions.

SECRETARY KLEIN: Are there any questions from the gentlemen on my left?

(No response)

SECRETARY KLEIN: On my right?

(No response)

SECRETARY KLEIN: Mr. Coulter, I especially buy "don't use the assimilative capacity of the Potomac River."

MR. COULTER: Thank you very much.

SECRETARY KLEIN: Fine. Thank you.

MR. McKEE: Mr. Chairman, Mr. John S. Hewins, the Maryland-National Capitol Park and Planning Commission.

STATEMENT OF

MR. JOHN S. HEWINS

GOVERNMENTAL RELATIONS COORDINATOR

THE MARYLAND-NATIONAL CAPITOL PARK

AND PLANNING COMMISSION

MR. HEWINS: I believe, Mr. Chairman, that with those last remarks, a little more needs to be said.

With your permission, I do have a number of exhibits that I would like to enter into the record, and instead of reading my statement, give you a brief summary of it in view of the hour.

SECRETARY KLEIN: Thank you.

MR. HEWINS: I am John S. Hewins, Governmental Relations Coordinator with The Maryland-National Capitol Park and Planning Commission.

The Maryland-National Capitol Park and Planning Commission has, for many years, been an advocate of strong measures to alleviate the problems of pollution in the waters adjoining its jurisdiction in Montgomery and Prince George's Counties, Maryland. Since 1927, with the creation of this agency, conservation measures have been practiced in the watersheds of the Potomac and

Patuxent Rivers where we are responsible for certain measures of development control.

Our stream valley park acquisition and development program, which began in the early 1930's under the Capper-Cramton Act, has maintained a consistent policy of stream protection. The stream valley park maintenance and development practices have done a great deal to retard, alleviate and, in some instances, remove the threat of soil erosion and subsequent sediment pollution in the tributaries of the Potomac and Patuxent Rivers. Careful conservation measures have been perpetuated during the implementation of well-designed development plans for all of our park areas--regional, stream valley, local and neighborhood parks.

Working closely with our two County governments, the Commission has consistenly improved its techniques of subdivision control to a point where, today, strong sediment control measures become a requisite after plat recordation and during the construction of a subdivision.

There are seven major areas of concern where the Commission has either direct control or acts in an advisory manner on matters pertaining to the pollution of its rivers and streams.

Proposed Potomac River Basin Compact

Beginning in early 1967 the Commission was among the many public agencies requested to comment and make recommendations on the proposed Potomac River Basin Compact. Staff review in November and December resulted in a statement adopted by the Commission in December 1967 and, in addition, a supplemental statement of policy approved by the Montgomery County Planning Board on November 30, 1967.

A year later staff again reviewed the revised proposed Compact and the staff cited again additional recommendations under cover memo dated December 6, 1968.

By letter of January 31, 1969, the Commission forwarded its comments to the Metropolitan Washington Council of Governments together with its staff recommendations indicating certain features which, in our opinion, were still unsatisfactory and recommending additional alterations.

Copies of these memoranda and letters are included for the record as Exhibit 1.

Low Density Zoning Policy Along the Banks of the Potomac River in Montgomery County.

One of the ways in which a planning agency can attack the problem of pollution is at its source. Zoning policies, though admittedly weak in controlling natural features, do have the effect of conservation policies when reducing density of development.

The Master Plan for Potomac-Travilah and Vicinity, adopted in 1967, states, on pages 6 and 7, primary goals and objectives of that plan. The salient points which relate specifically to the question of pollution are:

1. Preservation of the natural features and regional open space assets in the planning area.

2. Maintenance and encouragement of the present low density, residential character now prevailing in the planning area.

3. Protection of the Potomac River shoreline and of the historic C & O Canal, both so important for conservation and outdoor recreational purposes.

The general proposals of the Potomac-Travilah Master Plan are contained in statements on page 19, termed Natural Environmental Elements:

1. Preservation of the natural state of the Potomac shoreline for conservation purposes and for insuring the availability of the shoreline for outdoor recreational activity--(This will involve Federal ownership of a major portion of the land along the Potomac and the islands in the river and possibly the use of scenic easements.)

2. Continuance of the Potomac Valley Parkand its recreation system by acquisition of park lands adjacent to Muddy Branch and Watts Branch--(The preservation of major tributaries, such as Muddy Branch, by public acquisition is necessary and desirable to insure implementation of the conservation and beautification program for the central Potomac Basin.)

A copy of the Potomac-Travilah Master Plan is entered in the record as Exhibit 2.

The adopted Master Plan for the Rock Creek Planning Area, October 1968, is a plan for stream valley protection and development. This plan, a pioneer among environmental plans throughout the Nation, set forth far-reaching recommendations for the protection and preservation of the natural environment. I believe page 32 of this report best summarizes the importance of this plan.

The protected stream valley corridor concept of this plan suggests definite open space patterns (including those to be maintained privately) and development densities which work in harmony with the land. An ancillary aspect of this master plan is the proposed land treatment, the extent of which is a direct relationship between erosion potential and surface runoff. Other pertinent recommendations appear on page 47 of the plan.

A copy of the Rock Creek Master Plan is entered in the record as Exhibit 3.

Flood Plain Management

For several years the Corps of Engineers has prepared for our planning agency Flood Plain Information Reports which, by methods best known to you, define flood area limits which in turn serve as guides for local agencies interested in prudent use of flood lands.

The first such report covered the Seneca Creek Watershed and was published in June 1967. It, of course, recommends active participation in a flood plain management program. A copy of this report is presented for the record as Exhibit 4.

In June 1968 a similar report for the

northeast and northwest branches of the Anacostia River was produced by the Corps of Engineers for the Park and Planning Commission.

A copy of this report is submitted as Exhibit 5.

Watershed management programs under Public Law 566 have been entered into in cooperation with the Soil Conservation Service in the Rock Creek Watershed. Similar studies are pending in the Piscataway Creek and Seneca Watersheds. The flood control and recreational impoundments in Rock Creek already have shown significant results both in terms of flood control, sediment control, and enhancement of water recreation.

Most recently the Commission has urged a joint watershed study between Charles and Prince George's Counties for the Mattawoman Creek.

Sediment Control

In March 1967, under the sponsorship of the Montgomery County Council, Washington Suburban Sanitary Commission, Montgomery Soil Conservation District and MNCPPC, a Sediment Control Program was adopted for Montgomery County. This program instituted certain erosion and sediment control measures, incorporated procedures for control in subdivision plans, suggested periodic review and evaluation of the program, and directed the development of policies and procedures to implement sediment control measures. Periodic review has resulted in the tightening of regulatory procedures and a resulting improvement in the control of sediments coming from subdivision development.

A copy of the Sediment Control Program for Montgomery County is included as Exhibit 6.

I would like to take this opportunity to enlist the interest of the Federal Water Pollution Control Administration and the Maryland Department of Water Resources in the following research activities of particular interest to the Montgomery Sediment Control Task Force:

1. The sedimentation and hydrology in Rock Creek and Anacostia Basins, referred to earlier here today--the ten-year project which we cooperate in financially.

2. The Trap Efficiency Study in Lake Bernard Frank, North Branch, Rock Creek.

3. The proposed research on the trap

efficiency of sediment basins which is needed for improvement of design of these structures.

4. The proposed research in flocculation of sediment related to the demonstration project now being conducted in Lake Needwood by this Commission and the Dow Chemical Company.

Attached as Exhibit 7 is a copy of the agenda of the Task Force meeting of April 18, 1969, to discuss current and needed research in sediment and its control.

A similar Sediment Control Program is currently in voluntary use in Prince George's County. A copy of the proposed program is included as Exhibit 8.

Wastewater Treatment

Since we are not the agency responsible for this aspect of pollution, permit me to comment briefly on certain policies and suggestions which have been made from time to time by our agency.

1. We have long been an advocate of improved wastewater treatment at Blue Plains in the District of Columbia.

2. We have consistently supported the doctrine of "no discharge of treated effluent between

Monacacy River and Little Falls intake into the main stem of the Potomac."

3. A much belabored point, our concern over the manner of discharge from the Piscataway Treatment Plant has been previously documented. An outfall line to carry treated effluent to the main channel would help alleviate pollution in this portion of the estuary.

Environmental Protection

I would like to leave with you a copy of a bill recently enacted by the Maryland Legislature. This legislation, which we fostered from its inception is, in my mind, one of the best examples of a legal tool for the protection of a natural environment. True, it is for the Patuxent River rather than the Potomac but some of the principles set forth in this legislation have application for any drainage basin.

Exhibit 9 is a copy of this bill.

Beginning in the fall of 1968 the Commission inaugurated the first in a series of symposia on the general subject of open space. A series of reports produced by the Commission and presented at the first symposium dealt with a wide range of subjects. Out of the total of 16 publications I have selected five for inclusion in the record because I felt that your committee would be very interested in relating some of the recommendations of these reports to the general problems of pollution in the Potomac River.

They are:

Exhibit 10 - Toward an Open Space Strategy;

Exhibit 11 - Open Space and Implementation Tools--Rural, Agricultural and Conservation Zoning;

Exhibit 12 - Very Low Density Zoning, produced for the Commission by Robert Gladstone and Associates;

Exhibit 13 - Taxation and Development, produced for the Commission by the Washington Center for Metropolitan Studies;

Exhibit 14 - Recreational Zoning.

All of these reports were published in 1968.

Pending Local Legislation

In conclusion I would like to include for the record Exhibit 15--a draft copy of a proposed local ordinance to control excavation, grading and fill and the requirement that a permit be obtained from the county whenever any movement of earth is involved. This local ordinance is under review at the present time. The local Soil Conservation District has already included its suggestions in the current draft.

I want to thank you, Mr. Chairman, for this opportunity to read into the record the role which the Park and Planning Commission plays in the problems of pollution of the waters of the Potomac River in the Washington metropolitan area.

(The following listed 15 exhibits were submitted by Mr. Hewins for the record. They are on file at Headquarters, FWPCA, Washington, and the Regional Office, FWPCA, Charlottesville, Virginia:

1. Letter dated January 31, 1969, to Walter A. Scheiber, Executive Director of the Washington Metropolitan Council of Governments from Robert C. McDonell, Executive Director, with 6 attachments concerning review of the Potomac River Basin Compact.

2. Two maps; one entitled Master Plan Potomac-Travilah and Vicinity: Land Use Plan, dated February 1966, and the other entitled Master Plan Potomac-Travilah and Vicinity: Zoning and Highway Plan, dated February 1966. Also a brochure entitled Master Plan for the Potomac-Travilah and Vicinity, December 1967. All items published by the Maryland National Capital Park and Planning Commission.

3. Report dated October 1968, entitled Adopted Master Plan for the Rock Creek Planning Area: A Plan for Stream Valley Protection and Development prepared by the Maryland-National Capital Park and Planning Commission and an accompanying map entitled Land Use, Zoning and Highway Plan.

4. Report dated June 1967, entitled Flood Plain Information, Seneca Creek, Montgomery County, Maryland, prepared by the Department of the Army, Baltimore District, Corps of Engineers for the Maryland-National Capital Park and Planning Commission.

5. Report dated June 1968, entitled Flood Plain Information, Northeast Branch, Northwest Branch (Anacostia River), Paint Branch, Indian Creek, Sligo Creek, Prince Georges County, Maryland, by the Department of the Army, Baltimore District Corps of Engineers.

6. Report dated March 1967, entitled Sediment Control Program, Montgomery County, Maryland, published by the Maryland-National Capital Park and Planning Commission.

7. Memorandum dated March 26, 1969, to the Montgomery Sediment Control Task Force from Edward R. Keil for John Broda; Re: Calling a Meeting on Sediment Research

and Evaluation, dated March 26, 1969.

8. Report dated September 1968, entitled Sediment Control Program for Prince George's County, Maryland, published by the Maryland-National Capital Park and Planning Commission.

9. House of Delegates Bill No. 1298 relating to Patuxent River Watershed, Sedimentation and Waste Control.

10. Publication dated November 1968, entitled Towards An Open Space Strategy...Summary Highlight of Project Findings published by the Maryland-National Capital Park and Planning Commission.

11. Report No. 1 entitled General Planning Division Project on Open Space and Implementation Tools: Rural, Agricultural and Conservation Zoning; Part 1: Applicability to the Bi-County Region and ...; Part 2: Background Information published by the Bi-County Planning Services.

12. Working Paper No. 3 dated November 1968, entitled Very Low Density Zoning: A Practical Tool for Securing Private Open Space in Critical Area by the Maryland-National Capital Park and Planning Commission.

13. Working Paper No. 4 dated November 1968, entitled Taxation and Development: The Use of Tax Policies

for Preserving Open Space and Improving Development Patterns in the Bi-County Region by Carol S. Meyers, Research Associate for the Washington Center for Metropolitan Studies for the Maryland-National Capital Park and Planning Commission.

14. Working Paper No. 8 dated November 1968, entitled Recreational Zoning: Its Uses Elsewhere and Its Applicability in the Bi-County Region; published by the Maryland-National Capital Park and Planning Commission.

15. Letter dated March 4, 1969, to Mr. John J. Broda, Maryland-National Capital Park and Planning Commission from David L. Cahoon, County Attorney and Alfred H. Carter, Deputy County Attorney, Montgomery County, Maryland, with accompanying draft bill proposing a law to control excavation, grating and fills.)

SECRETARY KLEIN: Thank you, sir.

Are there any questions from the gentlemen on my left?

(No response)

SECRETARY KLEIN: On my right?

MR. McKEWEN: No.

SECRETARY KLEIN: Do you have one more?

MR. McKEE: Yes, sir, Mr. Chairman, I have one more witness, Dr. Arno Viehoever.

STATEMENT OF

DR. ARNO VIEHOEVER

CHAIRMAN, COMMITTEE OF HEALTH & SANITATION

CIVIC CONGRESS & BROAD CREEK CITIZENS' ASSOCIATION

DR. VIEHOEVER: Mr. Chairman, conferees, Mr. McKee, Mr. Coulter, Dr. Machis:

I listened to the last bitter drop. I have lived longer than you on the Potomac. I have seen it before the Blue Plains spoiled it for me, and I have swum in it and my family has swum in it.

I know when you remove the phosphorus especially, you will remove maybe not all the algae but essentially that which just spoils the whole shore from

June to October and beyond.

As delegated spokesman for both the Civic Congress of Southern Prince George's County and the Broad Creek Citizens' Association in Prince George's County I am authorized to urge:

1. Increased attention to the prevention of health hazards from the disease germs still present in fecal water or effluent such as especially the viruses, including those causing hepatitis and polio.

Alexandria papers reported several months ago 22 or more cases of hepatitis, observed in Fort Belvoir on the Potomac. Since the South American marmoset monkey has been shown to be an acceptable animal for the transmission of hepatitis, this will permit effective testing of fecal water. In fact, the pigmy marmoset, as small as mice and friendly, would likely serve as a perfect solution of the test animal problem.

The removal of viruses from water by polyelectrolytes, produced by Monsanto Co. St. Louis, Missouri, has been reported as long as two years ago in Nature Magazine, February 18, 1967, p. 665-7.

The immediate availability of this resin-like adsorbant and absorbant would suggest that immediate steps be taken to work out the small and large scale operations for the effective removal of viruses from virus carrying waters, thus preventing infections and epidemics.

I have been advised that the Health Authorities in Maryland might undertake such work. Our water purity standards surely need a provision for the testing of infectious viruses.

2. Instead of the costly two million pipeline to overcome stagnation and to remove the fecal water "out of sight" (as is being done, year after year in Blue Plains)--and thus creating a new, ever increasing, sewage dump near Mt. Vernon in the Potomac--

I made these suggestions:

1. Cut the water weeds, as is being done regularly in the Everglades;
2. Cut in the Piscataway Creek to overcome some of the stagnation;
3. Use turbine aspirators, tried out abroad for continued effective operation;
4. Construct in the large land and swamp area available the universally known and used oxidation ponds--under trained management--for biological and biochemical

breakdown of the fecal water. This operation is to be considered as a temporary measure until the contemplated plant facilities are operative.

5. Establish the merit of the Lewin process of precipitating a substantial amount of phosphates with high air pressure, as now being tested in the new treatment plant in Manassas, Virginia.

6. Consult with the Sanitary Officials in Chicago--Hannover Treatment Plant having under way the complete removal of disease-- and other objectionable carriers in their fecal waters.

I hope my suggestions will be considered seriously. Thank you.

SECRETARY KLEIN: Sir, you struck home to me on the Hannover Plant in Chicago.

It doesn't remove any bacteria or viruses. It does a tertiary treatment job by filtration. It does about 98 per cent. It does not remove any bacteria or viruses. It does not take out any phosphates or nitrogen.

Mr. Vincent Bacon out there is going to

go through other processes to do so. I am sorry, but you are mistaken on that.

Second, the best process we have thus far for taking viruses and bacteria out is the reverse osmosis, and that is being tested by the FWPCA, and so is the Lewin process that you referred to. That is FWPCA.

But we can't put experimental processes all over the country at once. We have got to test different kinds and see which come out the best, and then we can start using them.

Any comments from the gentlemen on my left?

(No response)

SECRETARY KLEIN: On the right?

(No response)

SECRETARY KLEIN: Mr. McKee?

MR. McKEE: Mr. Chairman, I had one other speaker but he was unable to continue here this afternoon. His paper is here and he would like to have it introduced in the record.

SECRETARY KLEIN: I understand his name is Jess Malcolm. His paper will be introduced in the record. I am sorry we didn't get to him earlier.

STATEMENT OF
MR. JESS W. MALCOLM
EXECUTIVE DIRECTOR
THE CHESAPEAKE BAY FOUNDATION, INC.

MR. MALCOLM: I am pleased to be here today on behalf of the private citizens of the greater Chesapeake Bay area to testify in support of the long-awaited action program to restore the water quality of the upper Potomac River Estuary. I see this action as the first step toward making the Potomac, our National River, the Nation's showpiece. Those of us who have spent our professional careers in the forefront of water resource management, especially during the last decade, now fully realize the absolute necessity of water quality restoration, not only because it may be simply desirable to do so, but because, in my opinion, we are left with no suitable alternative.

For those of you who are not familiar with the Chesapeake Bay Foundation, I should like to say that it is a privately supported, tax exempt citizen's organization, created on April 25, 1966, to act as an agent for the public interests in matters relating to the environmental welfare of Chesapeake Bay and its tidal tributaries. The Foundation had its genesis when a group of prominent Maryland and Virginia citizens became alarmed at the rate of water quality degradation within the greater Chesapeake Bay area and the apparent inability of government to contain it. It was their original belief, and one that I share, that only through the actions of an alert and informed public, who understand the issues and demand action, can the Chesapeake Bay region be maintained at a level of high environmental quality for this and succeeding generations.

The Chesapeake Bay Foundation is not opposed to change in the Chesapeake Bay environment, for we recognize that change is inevitable. But we also recognize that change need not be detrimental so long as it is properly planned and made beneficial in terms of total human ecology. From now on, we must think only in terms of what is desirable for the environmental health of the Chesapeake Bay region, and act accordingly. Future compromises in the environmental quality of Chesapeake Bay cannot be tolerated if we expect to maintain it as a viable and productive ecological unit.

The men who created the Chesapeake Bay

Foundation, I believe, merely reflected the attitude of the Nation's citizens who have grown weary of hearing our Nation's leaders boast about the great advances in our GNP when they, and the other citizens of the country, realized fully that the growth was made possible primarily by extracting from and the sacrificing of our natural resource wealth. The upper tidal Potomac, polluted as it is, is merely an example of a resource we have used as an economic alternative to the waste treatment measures the public is now demanding.

Those of us who are professionally concerned with the quality of our environment are reminded again by this hearing that the Nation is now in a foot-race between technical and economic growth, on the one hand, and a sensible environmental preservation and management policy on the other. However, in the case of water pollution, I am convinced that there is no alternative to pollution control at the source, for growth and load projections over time show conclusively that the only alternative to this form of corrective action--in other words, the alternative to pollution abatement--is rank acknowledgment that the water of the Nation will continue to be used for sewage treatment purposes. I daresay, however, that there are few people who would care to live in the vicinity of such a treatment facility.

Now I would like to further illustrate the point I made in my opening paragraph and the point alluded to in the preceding one. A few years ago, using FWPCA data, I developed a set of projections for the waste treatment levels required for the Delaware Estuary--an estuary, incidentally, not too unlike the Potomac--which showed that the level of in-plant treatment must continue to increase geometrically over time in order to maintain any selected level of estuarine water quality in the years ahead. Projections to the year 2020 for the Delaware Estuary produced curves that converged at levels well above 90% BOD removal, whether the water quality was to be maintained at the then existing levels or to be improved to a level comparable to that now under consideration for the Potomac Estuary. This leaves as the only essential difference in cost, which, incidentally, is also a public cost, the level at which we desire to maintain the quality of the Nation's waters.

Let us look at the question of water quality in another way. Consider, if you will, the feeling of the average American who stands awe-inspired at the edge of the Grand Canyon and the feeling of this same American who stands disgusted at the edge of the upper Potomac Estuary--both nature-given resources in the public trust,with population density being the only essential difference between the two.

Consider also the importance of today's proceedings to the average Washingtonian. Is it not unrealistic to expect citizens to act responsibly in civic matters if government itself fails in its full responsibility in those areas of the public trust?

Consider further what a clean Potomac, a clean Anacostia and a pollution-free Rock Creek would mean to the thousands of environmentally deprived children of the Washington area when spring fishing season arrives. While the FWPCA Potomac River Water Quality Report does not contain a cost breakdown for the treatment required to obtain the desired water quality standard, I daresay that the investment in a clean Potomac would be small,indeed, when measured against the total environmental health of the city. The water would again have utility, beauty and be a source of pride to all the residents.

These considerations point to the fact that the attitude of people is an important part of the formula under consideration here today.

J. W. Malcolm

A restored Potomac would achieve a further distinction. It would set an example for the rest of the Nation to follow. For as I am sure it is fully realized, the problem of water pollution is not confined to this area alone, but has become almost a universal blemish. Again, the matter of pride is at issue. For if corrective measures are not taken here, where then is the incentive for Philadelphia, Cleveland, New York and Baltimore to take the necessary corrective action? Conversely, if the mandate from these proceedings is not clear and decisive, a further example is set for the Nation to follow and one that few of us would be proud to say we were a part of. In short, I see it not only as the duty but the responsibility of those who live in the Nation's number one city, on its national river, to set the example for the rest of the Nation to follow.

The Potomac River quality report is quite comprehensive and clearly defines the problem and the job immediately ahead of us. It gives us a clear mandate. Not only is it time for a "get tough" water pollution policy but, more appropriately, I believe, it is time for a common sense environmental management policy. How many times must we be warned that we are on the one-way street to environmental disaster? I endorse the report as the first step toward restoring the quality of the tidal Potomac.

Thank you.

SECRETARY KLEIN: At this time we still have a number of speakers who are here.

If I may, gentlemen, I would like to go ahead because we have such a terrific amount to do yet tomorrow morning before we go into Executive Session.

May I call on Mr. Sam Gorelick of the Office of the Secretary of Defense?

Is Mr. Gorelick here?

MR. COOK: He didn't arrive.

SECRETARY KLEIN: From the Baltimore District, Corps of Engineers, Mr. Alfred E. Robinson.

May I ask the last witnesses, in the interests of brevity, will you submit your papers and please give us just a resume? I am sorry to do this to you. It is not fair to you, but I would appreciate it.

MR. ROBINSON: Yes, Mr. Chairman, I will try to make it as brief as possible.

STATEMENT OF

COLONEL W. J. LOVE

PRESENTED BY

MR. ALFRED E. ROBINSON

BALTIMORE DISTRICT, CORPS OF ENGINEERS

MR. ROBINSON: On behalf of the Baltimore District Engineer, Colonel W. J. Love, thank you for this opportunity to present our views on this problem of common concern--pollution--specifically pollution of the Potomac River. That portion of the Metropolitan Washington, at the head of the Potomac tidewater, is most vulnerable to the effects of pollution. Contaminants which enter here are not swept downstream as in a running river, but move back and forth with the tides only slowly being carried away--if at all. This makes the job of making the estuary the scenic, healthy body of water everyone desires much more difficult.

The involvement of the Corps of Engineers in Civil Work goes back nearly 150 years when, in 1824, the improvement of waterways and harbors was added to our list of responsibilities. Since that time, our responsibilities have broadened, and we have become increasingly concerned with all phases of water use--and misuse--including municipal and industrial wastes, agricultural wastes, petroleum "spills", and sedimentation. We also recognize that President Johnson's challenge to "clean up" all the waters of the United States, and particularly the Potomac, is a complex and monumental task requiring the expertise and energy of all persons concerned with our water resources.

As far as the Potomac is concerned, the Corps' first really formalized anti-pollution efforts were precipitated by the River and Harbor Act of 1899 and the Supervisory of the Harbor of New York Act of 1888 as amended in 1958. You might say that these two acts make the Corps of Engineers a limited caretaker of the Potomac Estuary.

Under the 1899 Act, authority was granted to the Corps to remove wrecks and obstructions which occur in the thoroughfare used by the general public for navigating waterways. The Act of 29 June 1888, as amended, provides for a Supervisory of the Harbor of Baltimore. The Harbor of Baltimore, by definition of Congress includes all the tidal waters of the Chesapeake Bay and its tributaries as lie within the State of Maryland. You should note that all the Potomac Estuary, except that portion within the District of Columbia, falls under this definition.

What do these laws mean in terms of pollution? Basically, the Corps, through policing action, can prevent the discharge of deleterious materials, such as solid wastes, fill material, or petroleum products, into the Potomac and can prosecute those persons who violate the law. If in the course of our work we discover a pollution violation which does not come within our authority, we report this violation to the proper agency. In this respect, we are now maintaining a constant vigilance on over 1000 miles of shoreline in Chesapeake Bay and its tributaries.

Drift, debris, and other trash are not only the most obvious and unsightly of the pollutants, but the most hazardous to navigation. Pleasure boats, particularly, are susceptible to damage from this source. Every year a number of deaths and thousands of dollars worth of damage result from collisions with tree trunks, telephone poles, and other types of debris. Recreation, or other types of activities, in this environment is far from appealing.

Prevention of this type of pollution is nearly impossible as deposits of trash by unconcerned people are not the only source of debris. As a previous Baltimore District Engineer, Colonel Kelley pointed out before the Interstate Commission on the Potomac in February of 1965, "trees die from drought or disease and limbs and trunks fall into the water. Outbuildings are washed into the river by floods, perhaps far upstream. Wharves are torn loose by storms or decay. Spring floods and other high river stages pick it up from creek and river banks and high tides locally bring down large quantities, storm drains add some and other items are deposited either willfully or by accident." If not removed, this filth and trash accumulates in the Washington tidal area, floating back and forth with the tide. Recognizing the great economic loss caused by this hazardous pollution, the Congress has directed the District Engineer to clean the Baltimore Harbor, the Anacostia River, and the Potomac estuary of all trash and debris. As far as the Potomac is concerned, the mandate applies to that area between Mount Vernon and the Chain Bridge and up the Anacostia to Bladensburg Bridge; for all practical purposes, this is all the tidal portion of Metropolitan Washington.

Our boats and debris collectors are working to keep the estuary free of unsightly and hazardous trash and debris. I'm sure many of you saw these boats in action on Tuesday's tour. A look at other parts of this river and other estuaries not maintained by the Corps emphasizes the need for an extension of our program.

SECRETARY KLEIN: We saw them all in the paper yesterday. They had pictures of them.

MR. ROBINSON: Yes, but our authority only goes as far as Mount Vernon, and it is obviously to be extended further down the estuary and to put it in other areas.

Let me now give some attention to the flowing river--the Potomac above Washington. In 1963, the Baltimore District Engineer forwarded to the Chief of Army Engineers a nine-volume report on the Potomac River Basin. This report sets forth the basin's water and related land resource needs as ascertained through over seven years of detailed study. As yet, the 1963 report has not been submitted to the Congress. But it has become a working set of papers around which further studies--and some action--on the Potomac will be based.

The 1963 report was concerned with all

aspects of water resource development. Specific recommendations for water quality included treatment of all municipal and industrial wastes to an average of 85 per cent effectiveness except at Washington where a minimum of 90 per cent would be required. Also recommended were pipelines to carry wastewater to acceptable points of discharge and structures to regulate the now uncontrolled flow of the river,thereby providing sufficient water for water supply and dilution of wastes and sufficient water to enhance water-oriented recreation. As of today, we have fallen far short of meeting the treatment goals and have hardly begun on low flow agumentation.

On 8 February 1965, former President Johnson directed the Secretary of the Interior "to review the Potomac River Basin development plan now under review by the Chief of Army Engineers and to work with affected States and local governments, the District of Columbia and interested Federal agencies to prepare a program for my consideration." To accomplish this, the Secretary of the Interior formed a Federal Interdepartmental Task Force on the Potomac consisting of representatives of the Departments of the Interior, the Army, Agriculture, Health, Education and Welfare, and Housing and Urban Development. To expedite the work, four functionally oriented sub-task forces were established. This staff planning team reviewed the project elements contained in the 1963 Corps plan as well as other alternatives for meeting the many water needs of the basin.

As a follow-up to the task force work, and based on the 1963 Report, the Chief of Engineers is preparing to submit to the Bureau of the Budget, through the Department of the Army, proposals for several multipurpose dam and reservoir projects to meet near future low-flow augmentation and recreation requirements which are urgently needed and which are compatible with the report of the Secretary of the Interior. This low-flow augmentation will generally serve two purposes-- increase water for domestic and industrial use, and enhance water quality.

Where does this leave us in terms of pollution control? Well, we know that not all pollution can be economically collected and treated at large central treatment plants. Debris and trash are good examples, but there are others which are even more insidious and much less publicized. How for instance, can we prevent bacteria- and nutrient-laden agricultural and storm drain runoff from polluting the river? How can we treat all sewage generated in rural homes? How can we most effectively control the effects of excessive nutrient loads? How can we minimize the esthetic effects of sedimentation? We still must look to other viable alternatives as answers. Reservoirs and low-flow augmentation, for instance, are proven, practical answers to many of these questions, particularly in the flowing portion of the Potomac River.

As far as the estauary is concerned, however, we do not know with any precision what effect an increase in water during low-flow periods will have.

This is one of the many problems which will be investigated during the authorized Chesapeake Bay Study, and we hope that answers willbe forthcoming. Of particular importance will be the Chesapeake Bay hydraulic model, which will include the Potomac Estuary, and which will be a most valuable tool for studying problems which cannot be studied by analytical means. A program of such studies is being set up, with advice and guidance from all governmental agencies having an interest in estuarine matters and, also, from a number of educational institutions.

And, of course, there is the ever promising prospect of an advancing technology. It sometimes seems as though every new technological advance breeds new waste problems faster than we are able to develope new treatment processes. Quite often, there is a log of many years between the birth of a waste problem and the evolution of a practicable treatment process. Provisions for low-flow augmentation provide insurance capable of ameliorating the effects of many types of contamination during the period when treatment processes are being developed or are not operable as designed or intended.

The Baltimore District Corps of Engineers realizes that the Potomac River, likeother streams, is a living, changing entity. A continued study of all alternative methods of pollution abatement is necessary if the river is to be a place where everyone can enjoy the economic--and esthetic--benefits of clean water.

Thank you very much, Mr. Chairman.

SECRETARY KLEIN: Thank you very much.

Are there any questions from the conferees on my left?

(No response)

SECRETARY KLEIN: Conferees on my right?

(No response)

SECRETARY KLEIN: We have two more to go. Mr. Richard Schwartz?

MR. COOK: I don't believe he has arrived, Mr. Chairman.

SECRETARY KLEIN: All right. Then we have Mr. F. H. Farrar of the National Wildlife Federation.

Mr. Farrar.

I am sorry to hold you this long. After this we have a statement. Mr. Minney finally showed up late and then had to leave again. He is from Indiana, and his statement will be placed in the record.

Mr. Farrar, thank you for waiting for us.

STATEMENT OF
MR. F. H. FARRAR
ASSISTANT DIRECTOR OF FIELD SERVICES
NATIONAL WILDLIFE FEDERATION

MR. FARRAR: Thank you, Mr. Chairman.

I am F. H. Farrar, Assistant Director of Field Services for the National Wildlife Federation, which has its national headquarters at 1412 Sixteenth Street, N.W., here in Washington, D.C.

For the purpose of identification, the

Federation is a private organization which seeks to attain conservation goals through educational means. The Federation has affiliates in 49 States, including Maryland, Virginia, West Virginia and Pennsylvania. These affiliates, in turn, are made up of local groups and individuals. When combined with associate members and other supporters of the National Wildlife Federation, these number an estimated 2-1/2 million persons.

From the very inception of our organization in 1936, water pollution control has been a primary objective of the National Wildlife Federation. Records indicate that the fourth resolution adopted in the initial annual meeting called for control of water pollution. Throughout the years, this problem has been in the forefront of our organization. We have treated the subject in all of our publications and radio-TV releases. It has been the only theme of "National Wildlife Week", which we sponsor, to be repeated. We still believe that contamination of the environment is the biggest resources problem facing the Nation today, and pollution of water certainly is a significant portion of it.

Over the years, Mr. Chairman, our organization has developed a few basic concepts which we believe should govern and guide everyone concerned about clean water. They are these:

1. Nobody has an inherent right to pollute public water resources;

2. Those who use public waters have a basic moral responsibility for returning them at least as clean as they received them;

3. Those who damage public waters should have the responsibility for repairing the damage; and,

4. The cost of waste treatment must be considered an integral part of the operating cost of "doing business", one to be shared by users of the products or services rather than being passed along to everyone through desecration of the environment.

It is our position that, if these principles are followed with Federal grants to municipalities for waste treatment plant construction and are backed by a strong and vigorous law enforcement program, we believe the Nation can do something to clean up and fulfill the stated purpose of the Federal Water Pollution Control Act:

> "To enhance the quality and value of our water resources and to establish a national policy for the prevention, control, and abatement of water pollution."

We also fear that if we do not apply these principles, degradation of the Nation's water will continue.

In light of this background, Mr. Chairman, this is the primary thrust of our testimony here today: We recommend that the Secretary of the Interior move ahead with prompt law enforcement action to convene a formal public hearing under provisions of Section 10(e) and (f) of the Federal Water Pollution Control Act and the procedures announced in FEDERAL REGISTER on March 26, 1969.

It is our contention that this, the third session of a conference called initially on August 22, 1957, gives the Secretary ample evidence to conclude that effective progress toward abatement of pollution in the Potomac is not being made and that the health and welfare of persons are being endangered. Further, since the second session of the conference was held in 1958--more than ten years ago--the appropriate State (or District of Columbia) and local jurisdictions have had ample time to institute remedial actions. It is our opinion that any objective Hearing Board will find that water pollution is occurring, yet progress toward abatement thus far is ineffective. Then, if prompt remedial action does not follow, we believe the Secretary should request that the U. S. Attorney General bring the necessary suit (or suits) against the offenders to compel abatement.

We are vigorous proponents of the so-called non-degradation policy, believing that any further lowering of the quality of water is not consistent with the stated purpose of the Federal Water Pollution Control Act--"to enhance". The Potomac, according to the recently released report of the Federal Water Pollution Control Administration, is so foul that even the technicians are hard-pressed to say whether or not the net situation is better or worse than ten years ago, despite commendable cleanup efforts by several jurisdictions. Suffice it to say that we hope the Secretary will consider the present level of the stream as "rock bottom" and that subsequent actions will do nothing except enhance the quality. Many residents of the area still can recall swimming in the Potomac yet the quality certainly has continued to go down until it is useful only for commercial navigation in addition to waste assimilation. Even recreational boaters who use the Potomac at the District do so at their own peril because even the spray is loaded with coliform bacteria. Esthetic values of the stream at the District must be appreciated from a distance--even picnicking nearby often is disgusting.

Of course, Mr. Chairman, we are aware of the various proposals which have been recommended with relation to management of the Potomac and its Basin. However, we are of the firm conviction that conservation and recreational programs, including pollution control, must continue without delay while comprehensive plans are being formulated.

Commenting upon specifics, we are in agreement with FWPCA recommendations for meeting Federal and State standards and for enhancing the quality of the stream in the District of Columbia area. These are:

1. A goal for removing 96 per cent of oxygen consuming materials in wastes and 98 per cent removal of bacterial pollutants;

2. A goal for removing 96 per cent of phosphorus in wastewater, a process which we understand

now is feasible;

3. Research to determine if discharges from several outlets rather then one outfall will help accelerate the assimilation of wastes through stream flow (note that the recommendation calls for a high degree of treatment prior to discharge);

4. Completion of the District's plan for separate sanitary sewer and storm sewer systems "as rapidly as feasible", no later than the year 2000. We fear that the "feasibility" may be misconstrued and request that a definite target date be agreed upon by the Secretary and the parties involved;

5. A basin-wide effort be launched to control silt pollution;

6. A systematic program be developed to prevent the disposal of trash, debris, and junk into the River and on the banks.

In conclusion, Mr. Chairman, I must say that we recognize the considerable costs involved in cleaning up the Potomac. However, in February 1969, the Gallup Organization, Inc., conducted an objective survey for the National Wildlife Federation which revealed that three out of four people interviewed were willing to pay additional taxes to improve their natural surroundings (a copy of the survey is attached). We believe they should be given the opportunity.

Thank you for the invitation and opportunity of making these remarks.

(The following document was submitted by Mr. Farrar for inclusion in the record:)

THE U. S. PUBLIC
CONSIDERS
ITS ENVIRONMENT

Conducted for National Wildlife Federation

A National Opinion Trends Report

The Gallup Organization, Inc.

53 Bank Street

Princeton, New Jersey

February, 1969

The terrible cliche that conservationists have a penchant for talking to themselves has deep roots in fact. Increasingly, however, conservationists are accused of talking only for themselves, which has potentially serious consequences; especially when repeatedly whispered by others into the ears of influential congressmen.

This attitude is painfully reflected in the filling of pork barrels while the battle against human predation by environmental deterioration wants for financial support.

It is obvious that neither the increasing ranks of conservationists, nor the news media's growing, if belated, enchantment with environmental issues have provided satisfactory indices of the public's desire for environmental quality.

Therefore, the National Wildlife Federation turned to those with expertise in plumbing public opinion: The Gallup Organization, Inc.

We don't pretend the attached report is the last word on public attitudes toward the environment. However, we do believe it contains substantive information of value to all involved in the common struggle for environmental quality.

Please feel free to duplicate it in whole or part. Naturally, the National Wildlife Federation would appreciate proper credit whenever possible.

* * *

INTRODUCTION

Objectives of the Study

The overall objective of the study was to provide information about the public's attitudes toward our natural surroundings. Specific objectives included:

1. Finding out to what extent the public is concerned about the degradation of our environment;
2. Investigating preferences for urban versus suburban or rural living;
3. Learning what is considered the most pressing problem with regard to our natural surroundings and what the public thinks should be done about the problems;
4. Determining whether or not the public favors setting aside more public land for conservation purposes.

Design of the Research

The objectives of the study were carried out by means of a personal interview survey conducted with a national sample of 1503 adults, 21 years of age and older. The interviewing took place during the last ten days in January 1969. The following questions were asked:

1. You may have heard or read claims that our natural surroundings are being spoiled by air pollution, water pollution, soil erosion, destruction of wildlife and so forth. How concerned are you about this--deeply concerned, somewhat concerned, or not very concerned?

2. How much would you be willing to pay each year in additional taxes earmarked to improve our natural surroundings--a small amount such as $10.00 or less, a moderate amount such as $50.00, or a large amount such as $100.00 or more?

3. It has been said that it will, at some time, be necessary to limit the human population (number of people) if our present living standards are to be maintained. Do you think this will be necessary or not?

4. Which of these kinds of places would

you find most pleasant as a place to live?

Respondents were shown a card which read as follows:

Mountains;

Seashore;

Rural area;

Small city;

Suburbs;

Large City;

Somewhere else?

5. In this country, which one of these do you think is the most pressing problem connected with our natural surroundings?

Respondents were shown a card which read as follows:

Air pollution;

Water pollution;

Soil erosion;

Wildlife preservation (birds and animals);

Preservation of open green spaces;

Pesticides (chemicals used to kill insects).

6. In your opinion what can be done to correct this problem? (Problem chosen in the above question)

7. Are you in favor of setting aside more public land for conservation purposes such as national parks, wildlife refuges, bird sanctuaries, and so forth, or not?

Information about the composition and design of the sample and tables of sampling tolerances to have in mind when reading the report will be found at the end of the report.

SOME HIGHLIGHTS OF THE STUDY

Concern About Our Natural Surroundings

About half (51%) of all persons interviewed stated that they are "deeply concerned" about the effect of air pollution, water pollution, soil erosion, and destruction of wildlife on our natural surroundings. About one-third (35%) said they were "Somewhat concerned" about the problem and twelve per cent said they are "Not very concerned". A greater proportion (62%) of those who have attended college than of those with less formal education are deeply concerned about these environmental problems. More of the men (56%) than of the women (46%) said they were deeply concerned. Also more of the people living in the western and midwestern States than of those in the East or South are deeply concerned.

Willingness to Pay Taxes to Improve our Natural Surroundings.

When those interviewed were asked about their willingness to pay additional taxes to improve our natural surroundings, almost three of every four people interviewed said they would be willing to pay something. It was found that those who had said they were "Deeply Concerned" about our environmental problems were willing to pay more in taxes to help solve the problems than those who did not express as much concern.

The Most Pressing Environmental Problem.

When those interviewed were shown a list of problems affecting the environment and asked which one they consider most pressing, replies divided as follows:

Air pollution, 36 per cent;
Water pollution, 32 per cent;
Pesticides (chemicals used to kill insects) 7 per cent;
Preservation of open green spaces, 6 per cent;
Wildlife preservation (birds and animals) 5 per cent;
Soil erosion, 4 per cent.

In cities of over 1,000,000 in population 55 per cent said air pollution was the most pressing problem while only twenty-three per cent of those in small communities and rural areas gave this answer. Preservation of wildlife was of greater concern to people in rural areas than to those in the urban areas.

Those interviewed were also asked what they think can be done to correct the problem chosen as most pressing. Results were as follows:

Problem and Most Frequently Mentioned Corrective Action:

Air pollution--find way to control auto exhaust; control of chemical and industrial wastes; provide filters, smoke control devices;

Water pollution--stop industrial pollution; enforce present laws, pass new legislation;

Soil erosion--plant or maintain vegetation; use proper agriculture methods;

Wildlife preservation--enforce game laws; reduce hunting; establish wildlife reserves, parks;

Preservation of open green spaces--set aside land for parks, forests; better zoning;

Pesticides--use different, improved pesticides; government controls, laws.

Will it be Necessary to Limit Human Population?

The U. S. public is evenly divided as to whether or not it will, at some time, be necessary to limit human population if our present living standards are to be maintained. Younger adults, those who have attended college, and those in the upper income brackets are more inclined to consider limitation of human population necessary than other groups.

Areas Thought Most Pleasant as a Place to Live

If a pleasant place to live were the principal consideration influencing the public, there would be a marked reversal of the trend away from rural areas. Those interviewed were shown the following list of areas and asked which of them they think would be most pleasant as places to live. Results divided as follows:

Rural area, 30 per cent;

Small city, 25 per cent;

Suburbs, 18 per cent;

Mountains, 15 per cent;

Seashore, 9 per cent;

Large city, 6 per cent;

Other, 1 per cent.

Analyses by size of community show that

many big city dwellers have a yearning for smaller places and those in rural areas have no yen for the big city.

Should More Land be Set Aside for Conservation Purposes?

Three of every four people interviewed favor setting aside more public land for conservation purposes such as national parks, wildlife refuges, bird sanctuaries, etc. Young people, those who have attended college, and those in the eastern States are more inclined to this view than other segments of the population.

* * *

CONCERN ABOUT OUR NATURAL SURROUNDINGS

The question: *You may have heard or read claims that our natural surroundings are being spoiled by air pollution, water pollution, soil erosion, destruction of wildlife and so forth. How concerned are you about this -- deeply concerned, somewhat concerned, or not very concerned?*

	Deeply Concerned	Somewhat Concerned	Not Very Concerned	No Opinion	Total	Number of Interviews
	%	%	%	%	%	
National Results	51	35	12	2	100	(1503)
By Sex						
Men	56	31	10	3	100	(744)
Women	46	38	14	2	100	(759)
By Age						
21-34 years	51	41	7	1	100	(403)
35-49 years	50	38	10	2	100	(476)
50 years and older	52	28	16	4	100	(605)
Undesignated - 19						
By Education						
College	62	32	6	*	100	(395)
High school	52	37	10	1	100	(748)
Grade school	39	34	20	7	100	(352)
Undesignated - 8						
By Annual Family Income						
$10,000 and over	58	34	8	0	100	(449)
$7,000 - $9,999	53	38	8	1	100	(336)
$5,000 - $6,999	55	35	8	2	100	(237)
Under $5,000	41	34	20	5	100	(463)
Undesignated - 18						
By Size of Community						
1,000,000 and over	51	36	8	5	100	(277)
250,000 - 999,999	52	35	11	2	100	(296)
50,000 - 249,999	55	35	9	1	100	(235)
2,500 - 49,999	52	31	16	1	100	(233)
Under 2,500	46	37	14	3	100	(462)
By Region of Country						
East	46	38	12	4	100	(425)
Midwest	56	34	9	1	100	(400)
South	44	36	16	4	100	(428)
West	59	31	10	*	100	(250)

* Less than half of one per cent.

WILLINGNESS TO PAY TAXES TO IMPROVE NATURAL SURROUNDINGS

The question: *How much would you be willing to pay each year in additional taxes earmarked to improve our natural surroundings - a small amount such as $10.00 or less, a moderate amount such as $50.00, or a large amount such as $100.00 or more?*

	Small Amount	Moderate Amount	Large Amount	None	Don't Know	Total	Number of Interviews
	%	%	%	%	%	%	
National Results	51	18	4	9	18	100	(1503)
By Sex							
Men	49	21	6	9	15	100	(744)
Women	53	16	2	9	20	100	(759)
By Age							
21-34 years	53	25	5	5	12	100	(403)
35-49 years	52	20	3	8	17	100	(476)
50 years and older	49	13	4	12	22	100	(605)
Undesignated - 19							
By Education							
College	45	30	12	5	8	100	(395)
High school	52	20	2	9	17	100	(748)
Grade school	54	6	1	12	27	100	(352)
Undesignated - 8							
By Annual Family Income							
$10,000 and over	45	28	10	6	11	100	(449)
$7,000 - $9,999	52	20	3	10	15	100	(336)
$5,000 - $6,999	59	15	2	8	16	100	(237)
Under $5,000	52	10	1	11	26	100	(463)
Undesignated - 18							
By Size of Community							
1,000,000 and over	52	19	5	4	20	100	(277)
250,000 - 999,999	43	28	6	8	15	100	(296)
50,000 - 249,999	53	16	2	12	17	100	(235)
2,500 - 49,999	49	18	4	12	17	100	(233)
Under 2,500	56	13	2	9	20	100	(462)
By Region of Country							
East	49	17	6	9	19	100	(425)
Midwest	56	19	3	11	11	100	(400)
South	51	15	3	6	25	100	(428)
West	47	24	3	9	17	100	(250)

THE MOST PRESSING ENVIRONMENTAL PROBLEM

The question: *In this country, which one of these* (Respondent shown card) *do you think is the most pressing problem connected with our natural surroundings?*

	National Results	By Sex	
		Men	Women
	%	%	%
Air pollution	36	33	40
Water pollution	32	36	27
Pesticides (chemicals used to kill insects)	7	6	8
Preservation of open green spaces	6	4	7
Wildlife preservation (birds and animals)	5	6	4
Soil erosion	4	6	3
Don't know	10	9	11
Total	100	100	100
Number of interviews	(1503)	(744)	(759)

	By Age		
	21-34 Years	35-49 Years	50 Years and Older
	%	%	%
Air pollution	42	39	31
Water pollution	32	32	31
Pesticides (chemicals used to kill insects)	3	6	11
Preservation of open green spaces	7	7	4
Wildlife preservation (birds and animals)	6	4	5
Soil erosion	2	3	6
Don't know	8	9	12
Total	100	100	100
Number of interviews	(403)	(476)	(605)
Undesignated	19		

THE MOST PRESSING ENVIRONMENTAL PROBLEM (Continued)

The question: *In this country, which one of these* (Respondent shown card) *do you think is the most pressing problem connected with our natural surroundings?*

	By Education		
	College	High School	Grade School
	%	%	%
Air pollution	40	39	29
Water pollution	34	31	31
Pesticides (chemicals used to kill insects)	5	8	7
Preservation of open green spaces	8	5	4
Wildlife preservation (birds and animals)	4	5	7
Soil erosion	3	4	5
Don't know	6	8	17
Total	100	100	100
Number of interviews	(395)	(748)	(352)
Undesignated	8		

	By Annual Family Income			
	$10,000 and Over	$7,000-$9,999	$5,000-$6,999	Under $5,000
	%	%	%	%
Air pollution	42	42	36	28
Water pollution	32	32	33	30
Pesticides (chemicals used to kill insects)	6	7	6	8
Preservation of open green spaces	9	5	5	3
Wildlife preservation (birds and animals)	3	5	7	7
Soil erosion	3	1	5	7
Don't know	5	8	8	17
Total	100	100	100	100
Number of interviews	(449)	(336)	(237)	(463)
Undesignated	18			

THE MOST PRESSING ENVIRONMENTAL PROBLEM (Continued)

The question: *In this country, which one of these* (Respondent shown card) *do you think is the most pressing problem connected with our natural surroundings?*

	By Size of Community				
	1,000,000 and Over	250,000-999,999	50,000-249,999	2,500-49,999	Under 2,500
	%	%	%	%	%
Air pollution	55	41	41	29	23
Water pollution	22	33	32	34	34
Pesticides (chemicals used to kill insects)	6	5	5	8	10
Preservation of open green spaces	6	5	5	8	6
Wildlife preservation (birds and animals)	1	3	3	6	10
Soil erosion	2	4	4	4	5
Don't know	8	9	10	11	12
Total	100	100	100	100	100
Number of interviews	(277)	(296)	(235)	(233)	(462)

	By Region of Country			
	East	Midwest	South	West
	%	%	%	%
Air pollution	43	34	26	47
Water pollution	31	38	30	24
Pesticides (chemicals used to kill insects)	5	6	10	6
Preservation of open green spaces	6	5	6	6
Wildlife preservation (birds and animals)	3	5	7	6
Soil erosion	2	4	6	5
Don't know	10	8	15	6
Total	100	100	100	100
Number of interviews	(425)	(400)	(428)	(250)

WHAT PUBLIC WOULD DO TO CORRECT ENVIRONMENTAL PROBLEMS

Following the question reported on the immediately preceding pages under the heading: "The Most Pressing Environmental Problem," those interviewed were asked the following question with respect to the problem chosen as most pressing:

In your opinion what can be done to correct this problem?

The following tables summarize replies:

Air Pollution

	Per Cent
Find way to control auto exhaust	24
Control of chemical and industrial wastes	17
Provide filters, smoke control devices	16
Enforce present laws or pass new legislation	10
Careful study, research	7
Do away with gasoline engine	6
Control burning of rubbish or garbage	3
Move industry to the suburbs	2
Educate the public	1
Other answers	3
Don't know	31
Total*	120
Number of interviews	(538)

* Total exceeds 100% due to multiple responses.

Verbatim examples of answers concerning what might be done to prevent air pollution include:

More federal money put into this problem.

Get in a specialist and see what he could do to get it corrected.

Move some of the industry to the suburbs instead of in the city.

Maybe if they would take some of these chemical places way out.

If there was some way they could control filtering and doing away with gases if possible.

Education of the general public. Tax according to displacement of the engine instead of weight of cars. Industry tax rebate to encourage new equipment.

Stricter control and very heavy fines on offenders - especially large corporations.

(Continued)

Industry's the guiltiest. Open burning should be stopped by individuals. Perhaps a control center could tell us proper air currents to burn in.

Quit burning old cars--put things on cars to stop the gas pollution.

I wonder if they couldn't have an airplane go over and fumigate everyplace.

Get after those technical facilities that cause this in cities primarily.

Leave it up to some government official with that knowledge.

Apply the same sort of policy here as has been applied to problems of national defense--sponsored research, an educational element.

Let the government get more involved in finding the solutions.

Through the Federal Government--by spending money. Make a study of it.

The present laws regarding air pollution should be enforced.

I think it's pretty much up to the State to make and enforce legislation to take care of it. Make whoever is causing this to pay out of the pocket for whatever they're contributing. Each one should take care of whatever he's causing.

Electric cars for less pollution.

Hurry up and put on the market new cars that go gasless; no pollution from cars would help.

They talk about these new cars which wouldn't have so much exhaust. That would be one thing. I've also heard that industry could do something different if they wanted to.

Really I think the auto manufacturers must do something about it. We'll have to pay dearly for it. It's up to the auto makers.

Find means of eliminating the poisons going up in the air, like burning garbage, gasoline fumes.

Get rid of cars and do something about airplane fumes.

Take care of the earth first and the moon second.

We'll probably have to start putting factories way out into the suburban areas. Not allow new buildings that would pollute air to build in cities.

New highways to eliminate truck traffic in communities.

Start new cities where there is land.

Close down places which do not make an honest effort to correct air pollution.

Educate people not to pollute and respect all forms of anti-pollution requests.

Cut out all the automobiles and go back to horses and buggies.

More chemical research to eliminate by-products of the combustion process.

Stopping or doing away with carbon monoxide gas in cars.

Be more careful the way they use chemicals and gases and what you have that creates all this.

They should find out something about it. The automobiles and the sewage is terrible.

WHAT PUBLIC WOULD DO TO CORRECT ENVIRONMENTAL PROBLEMS (Cont'd)

The Question: In your opinion what can be done to correct this problem?

Water Pollution

Stop industrial pollution, 26 per cent;

Enforce present laws, pass new legislation, 23 per cent;

Keep sewage out of water, 12 per cent;

Individuals should be more careful, 8 per cent;

Careful study, research, 5 per cent;

Sewage conversion plants, 5 per cent;

Educate the public, 3 per cent;

Chemically purify the water, 3 per cent;

Use filters, 2 per cent;

Other answers, 2 per cent;

Don't know, 27 per cent;

Total (exceeds 100% [illegible] to multiple responses), 1[illegible]6 per cent.

Number of interviews, ([illegible]75).

Verbatim examples of answers concerning what might be done to prevent water pollution include:

Every city and town should have sewage conversion plants; also laws for factories to quit dumping in rivers.

Find another way to get rid of the scraps from the factories;

Correct industrial waste being dumped into rivers and lakes. Also educate the farmers to take care of streams--insecticides and so forth are allowed to enter them.

A lot taken out of sea water so that it can be used for drinking--a substitute.

Watch fertilizer and application of herbicides and pesticides getting into our water supply.

The only thing I know is to spend a lot of money to try to clean up the rivers and the streams and then restrict the use of them.

Putting responsibility to the ones who are polluting it.

Well all they do is spend money! The factories should clean up their mess and use different soap--no detergent.

They should do something to keep people from throwing things in the water, and companies dumping junk in it.

Quit dumping all these sewers inthe streams.

Give industry tax incentive to reduce the amount of pollution dumped into streams and force cities and towns to cease dumping raw sewage into streams.

We need to get on to all our big local plants as they are polluting our streams.

Stop throwing garbage in water--especially factory wastes. Should be treated. Government should induce, not force, responsible parties.

Stricter law enforcement as to things put into the water by factories, including the packing houses.

Big plants should not dump waste in water we have to use.

Start on largest amount--industrial pollution--and reduce it 50%. That's what's killing all the fish.

Put medicine in the water--chemicals.

Clean up areas that drain into main river. Stricter enforcement of litter laws. All government involved should bear down on those polluting our waters.

Just have better laws.

Quite a bit. Complicated, takes a lot of money. Government control. Federal industry could help.

That would have to be attacked on many fronts. Stricter policing. Well, those persons that are responsible for water pollution will have to be pulled up on a shorter leash.

Get after the industries and have more control on the State level. Have the State control it.

To use more of our tax money for this purpose rather than war. Clamp down on large corporations who pollute waters.

Put teeth in the law; increase fines to be stiff enough so that people won't thorw waste and garbage in the water.

Do like Sioux City has done--build the sewage disposal plant. These small towns in Iowa are the big offenders.

More educational programs to direct the people.

Experts are paid to do this.

Curb industry's use of it or make them clean it up. Sewer facilities--improve the private facilities; some of them are inadequate.

Have a committee and deeply look into the situation and correct it.

* * *

The question: In your opinion what can be done to correct this problem?

Soil Erosion

Plant or maintain vegetation, 27 per cent;

Proper agriculture methods, 14 per cent;

Have government sponsored program, 11 per cent;

Research, new methods to retain soil, 7 per cent;

Other answers, 8 per cent;

Don't know, 37 per cent;

Total (exceeds 100% due to multiple responses), 104 per cent;

Number of interviews, (74).

Verbatim examples of answers concerning what might be done to prevent soil erosion include:

Let the soil conservation people and the county take care of the job.

Plant grass, trees, shrubs to hold soil.

Starting with the soil--keep it in good condition and other things will be helped.

Work on this more than they have before.

Keep the land planted. Sow or plant trees.

Leave more of our hilly land covered with grass or trees.

Plant more pastures.

Not give raises to public officials and use it for conservation.

Sponsor a program to help make the land richer and more fertile.

Build levees or such every so often to keep soil from washing away.

You would have to control all streams that overflow and do damage. Proper planting of vegetation to control the runoff.

I think problems such as these are best taken care of by following recommendations of a good agriculture college.

People have to learn to take care of property.

I work with soil conservation, erosion control--dam the creeks, contour plowing, cover crops.

Sowing grass and legumes.

* * *

The question: In your opinion what can be done to correct this problem?

Wildlife Preservation

Enforce game laws, 40 per cent;

Reduce hunting, 25 per cent;

Establish wildlife reserves, parks, 20 per cent;

Control air and water pollution, 7 per cent;

Other answers, 9 per cent;

Don't know, 16 per cent;

Total (exceeds 100% due to multiple

responses), 117 per cent;

Number of interviews, (76).

Verbatim examples of answers concerning what might be done to preserve wildlife include:

Doing a pretty good job. Growing population causes loss of birds and animals. Better hunting controls and better park control--danger of unbalancing nature at present time.

Stricter enforcement of game laws. Control over snowmobiles.

Enforce the laws such as hunting and fishing.

Make sure game wardens enforce the law like they should.

More enforcement of present laws.

Keep areas for this purpose. Have wildlife reserves wherever possible.

Development of areas, such as game preserves.

Cut down on hunting and amount of tags issued. Control fishing and have more reserves, more national parks.

Set aside more places for preservation of wildlife which is becoming scarce.

Shorter hunting season.

Be more careful--not to kill too many.

We can prevent forest fires.

The big industry leased all the land, so we have no wildlife to enjoy. Stop this.

* * *

The question: In your opinion, what can be done to correct this problem?

Preservation of Open Green Spaces

Set aside land for parks, forests, 31 per cent;

Better zoning, 31 per cent;

Limit the spread of commercialism, 11 per cent;

Other answers, 4 per cent;

Don't know, 30 per cent;

Total (exceeds 100% due to multiple responses), 107 per cent;

Number of interviews, (83).

Verbatim examples of answers concerning what might be done to preserve open green spaces include:

They should set aside more government property for national parks for people to enjoy the outdoors.

More land for parks, etc.

More State land and Federal parks and reservations maintained.

More sewage treatment, better treatment plants, more national forests.

Could give us more parks for more outdoors.

Create more parks and plant more trees. I miss the forest we had in Germany.

Don't ruin the countryside by building large throughways. Better government control of scenic areas. Don't allow commercialization of them and keep them open for all citizens to enjoy.

Should be some type of control for these junk heaps, billboards, and the ruination in areas by industry and by waste.

Better planning, better zoning.

Limit housing developments and construction and better maintenance of it.

Limit population.

Laws are restricted. Pass legislation for parks and for wildlife reserves. Air and water pollution are also very important. Limit expansion of cities and making parks and so forth.

Zoning.

* * *

The question: In your opinion what can be done to correct this problem?

Pesticides

Use different, improved pesticides, 26 per cent;

Government controls, laws, 18 per cent;

Use with discretion, 14 per cent;

Stop using pesticides, 7 per cent;

Other answers, 6 per cent;

Don't know, 31 per cent;

Total (exceeds 100% due to multiple responses), 102 per cent;

Number of interviews, (112).

Verbatim examples of answers concerning what might be done to prevent the harmful effects of pesticides include:

Stronger government controls over pesticides. I don't use it on this piece of property. I'm a bird feeder.

F. H. Farrar

They should put a restriction on homeowners using pesticides. Government controlled.

Laws to control use of sprays and content of chemicals such as DDT.

Programs for eradication by the Department of Agriculture.

They are not labeled right. They are deadly if not used right. They are improperly advertised and used excessively. The Government should regulate usage.

The person who uses pesticides should try to understand the uses and danger of these. Read directions and use carefully.

Be careful of the kinds used, so there is no harm to people and our foods.

Stop using it.

The sprays and the fertilizers wash into the rivers and kill the fish. It's overdone entirely. Go back to good old manure for fertilizing.

Use some space money maybe for better sprays and powders.

Use liquids rather than dust--won't spread so.

Try to find other ways to eliminate pests.

Correct pesticides by spraying and dusting.

* * *

WILL IT BE NECESSARY TO LIMIT HUMAN POPULATION?

The question: *It has been said that it will, at some time, be necessary to limit the human population (number of people) if our present living standards are to be maintained. Do you think this will be necessary or not?*

	Necessary	Not Necessary	Don't Know	Total	Number of Interviews
	%	%	%	%	
National Results	44	43	13	100	(1503)
By Sex					
Men	47	42	11	100	(744)
Women	41	45	14	100	(759)
By Age					
21-34 years	55	37	8	100	(403)
35-49 years	44	43	13	100	(476)
50 years and older	36	48	16	100	(605)
Undesignated - 19					
By Education					
College	60	34	6	100	(395)
High school	45	44	11	100	(748)
Grade school	29	51	20	100	(352)
Undesignated - 8					
By Annual Family Income					
$10,000 and over	53	38	9	100	(449)
$7,000 - $9,999	52	39	9	100	(336)
$5,000 - $6,999	41	45	14	100	(237)
Under $5,000	32	50	18	100	(463)
Undesignated - 18					
By Size of Community					
1,000,000 and over	50	36	14	100	(277)
250,000 - 999,999	48	40	12	100	(296)
50,000 - 249,999	43	46	11	100	(235)
2,500 - 49,999	42	47	11	100	(233)
Under 2,500	38	47	15	100	(462)
By Region of Country					
East	45	39	16	100	(425)
Midwest	44	47	9	100	(400)
South	36	47	17	100	(428)
West	54	39	7	100	(250)

AREAS THOUGHT TO BE MOST PLEASANT AS A PLACE TO LIVE

The question: *Which of these kinds of places* (Respondent shown card) *would you find most pleasant as a place to live?*

	National Results	By Sex	
		Men	Women
	%	%	%
Rural area	30	30	30
Small city	25	24	27
Suburbs	18	17	19
Mountains	15	17	12
Seashore	9	10	9
Large city	6	5	7
Other	1	*	1
Don't know	1	1	1
Total**	105	104	106
Number of interviews	(1503)	(744)	(759)

	By Age		
	21-34 Years	35-49 Years	50 Years and Older
	%	%	%
Rural area	27	32	30
Small city	20	22	31
Suburbs	16	22	17
Mountains	20	15	11
Seashore	11	11	6
Large city	8	4	6
Other	1	*	1
Don't know	2	1	1
Total**	105	107	103
Number of interviews	(403)	(476)	(605)
Undesignated		19	

* Less than half of one per cent.

** Totals exceed 100% since a few respondents named more than one area.

AREAS THOUGHT TO BE MOST PLEASANT AS A PLACE TO LIVE (Continued)

The question: *Which of these kinds of places* (Respondent shown card) *would you find most pleasant as a place to live?*

	By Education		
	College	High School	Grade School
	%	%	%
Rural area	20	31	36
Small city	24	24	29
Suburbs	18	20	14
Mountains	15	15	14
Seashore	19	8	3
Large city	9	5	6
Other	1	1	0
Don't know	1	2	1
Total*	107	106	103
Number of interviews	(395)	(748)	(352)
Undesignated	8		

	By Annual Family Income			
	$10,000 and Over	$7,000-$9,999	$5,000-$6,999	Under $5,000
	%	%	%	%
Rural area	23	31	32	32
Small city	22	24	23	30
Suburbs	23	19	14	16
Mountains	16	15	17	12
Seashore	17	7	9	5
Large city	6	8	6	6
Other	1	0	1	1
Don't know	1	2	1	1
Total*	109	106	103	103
Number of interviews	(449)	(336)	(237)	(463)
Undesignated	18			

* Totals exceed 100% since a few respondents named more than one area.

AREAS THOUGHT TO BE MOST PLEASANT AS A PLACE TO LIVE (Continued)

The question: *Which of these kinds of places* (Respondent shown card) *would you find most pleasant as a place to live?*

	By Size of Community				
	1,000,000 and Over	250,000-999,999	50,000-249,999	2,500-49,999	Under 2,500
	%	%	%	%	%
Rural area	13	14	16	20	64
Small city	22	21	35	44	16
Suburbs	28	27	22	11	8
Mountains	14	13	15	16	15
Seashore	13	15	11	8	3
Large city	13	13	4	2	1
Other	1	1	1	*	*
Don't know	3	1	1	*	1
Total**	107	105	105	101	108
Number of interviews	(277)	(296)	(235)	(233)	(462)

	By Region of Country			
	East	Midwest	South	West
	%	%	%	%
Rural area	23	33	39	22
Small city	16	30	27	30
Suburbs	27	17	14	10
Mountains	14	11	14	24
Seashore	13	7	8	9
Large city	9	6	5	4
Other	*	1	0	1
Don't know	2	0	1	3
Total**	104	105	108	103
Number of interviews	(425)	(400)	(428)	(250)

* Less than half of one per cent.

** Totals exceed 100% since a few respondents named more than one area.

SHOULD MORE PUBLIC LAND BE SET ASIDE FOR CONSERVATION PURPOSES?

The question: *Are you in favor of setting aside more public land for conservation purposes such as national parks, wildlife refuges, bird sanctuaries, and so forth, or not?*

	Yes	No	Don't Know	Total	Number of Interviews
	%	%	%	%	
National Results	75	19	6	100	(1503)
By Sex					
Men	76	19	5	100	(744)
Women	74	19	7	100	(759)
By Age					
21-34 years	83	13	4	100	(403)
35-49 years	76	18	6	100	(476)
50 years and older	69	24	7	100	(605)
Undesignated - 19					
By Education					
College	82	15	3	100	(395)
High school	78	18	4	100	(748)
Grade school	64	26	10	100	(352)
Undesignated - 8					
By Annual Family Income					
$10,000 and over	81	16	3	100	(449)
$7,000 - $9,999	81	15	4	100	(336)
$5,000 - $6,999	75	18	7	100	(237)
Under $5,000	66	25	9	100	(463)
Undesignated - 18					
By Size of Community					
1,000,000 and over	79	15	6	100	(277)
250,000 - 999,999	78	17	5	100	(29[illegible])
50,000 - 249,999	80	16	4	100	(235)
2,500 - 49,999	78	19	3	100	(233)
Under 2,500	66	25	9	100	(462)
By Region of Country					
East	82	12	6	100	(425)
Midwest	76	20	4	100	(400)
South	68	24	8	100	(428)
West	75	21	4	100	(250)

TECHNICAL APPENDICES

Composition of the Sample

National

100 per cent

Sex of Respondent

Men, 46.6 per cent;

Women, 53.4 per cent;

Total, 100 per cent.

Age of Respondent

21-34 years, 27.6 per cent;

35-49 years, 32.2 per cent;

50 years and older, 39.2 per cent;

Undesignated, 1.0 per cent;

Total, 100 per cent.

Education of Respondent

College (complete and incomplete), 22.5 per cent;

High school (complete and incomplete), 50.5 per cent;

Grade school or no schooling, 26.8 per cent;

Undesignated, .2 per cent;

Total, 100 per cent.

Annual Family Income

$10,000 and over, 27.4 per cent;

$7,000-$9,999, 22.5 per cent;

$5,000-$6,999, 16.1 per cent;

$3,000-$4,999, 13.2 per cent;

Under $3,000, 19.5 per cent;

Undesignated, 1.3 per cent;

Total, 100 per cent.

Size of Community

1,000,000 and over, including urban fringe, 19.3 per cent;

250,000-999,999, including urban fringe, 20.1 per cent;

50,000-249,999, including urban fringe, 15.8 per cent;

2,500-49,999, 15.0 per cent;

Under 2,500, 29.8 per cent;

Total, 100 per cent.

Region of Country

East: Maine, New Hampshire, Rhode Island, Connecticut, Vermont, Massachusetts, New York, New Jersey, Pennsylvania, West Virginia, Delaware, Maryland, District of Columbia, 29.6 per cent;

Midwest: Ohio, Indiana, Illinois, Michigan, Minnesota, Wisconsin, Iowa, North Dakota, South Dakota, Kansas, Nebraska, Missouri, 26.8 per cent;

South: Kentucky, Tennessee, Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Texas, Arkansas, Oklahoma, Louisiana, 27.3 per cent;

West: Arizona, New Mexico, Colorado, Nevada, Montana, Idaho, Wyoming, Utah, California, Washington, Oregon, Alaska, Hawaii, 16.3 per cent.

Total, 100 per cent.

* * *

NOTE

Allowance for persons not at home was made by means of a "times-at-home" technique rather than by "call-backs." Either procedure is a standard method for reducing the sample bias that would otherwise result from under-representation in the sample of persons who are difficult to find at home. All results reported including the composition of the sample are based on data in which a "times-at-home" weighting has been incorporated. The actual number of interviews made for various population groups are reported in the findings.

DESIGN OF THE SAMPLE

The design of the sample is that of a replicated probability sample down to the block level in the case of urban areas, and to segments of townships in the case of rural areas.

After stratifying the Nation geographically and by size of community in order to insure conformity of the sample with the latest available estimate of the Census Bureau of the distribution of the adult population, sampling locations or areas were selected on a strictly random basis. The interviewers had no choice whatsoever concerning the part of the city or county in which they conducted their interviews.

Interviewers were given maps of the area to which they were assigned, with a starting point indicated, and required to follow a specified direction. At each occupied dwelling unit, interviewers were instructed to select respondents by following a prescribed systematic method and by a male-female assignment. This procedure was followed until the assigned number of interviews was completed.

Since this sampling procedure is designed to produce a sample which approximates the adult civilian population (21 and older) living in private households in the United States (that is, excluding those in prisons and hospitals, hotels, religious and educational institutions, and on military reservations), the survey results can be applied to this population for the purpose of projecting percentages into number of people. The manner in which the sample is drawn also produces a sample which approximates the population of private households in the United States. Therefore, survey results can also be projected in terms of number of households when appropriate.

* * *

SAMPLING TOLERANCES

In interpreting survey results, it should be borne in mind that all sample surveys are subject to sampling error, that is, the extent to which the results may differ from what would be obtained if the whole population surveyed had been interviewed. The size of such sampling errors depends largely on the number of interviews.

The following tables may be used in estimating the sampling error of any percentage in this report. The computed allowances have taken into account the effect of the sample design upon sampling error.

They may be interpreted as indicating the range (plus or minus the figure shown) within which the results of repeated samplings in the same time period could be expected to vary, 95 per cent of the time, assuming the same sampling procedure, the same interviewers, and the same questionnaire.

The first table shows how much allowance should be made for the sampling error of a percentage:

Recommended Allowance For Sampling Error of a Percentage

In Percentage Points (at 95 in 100 confidence level)

(The chances are 95 in 100 that the sampling error is not larger than the figures shown.)

	--------------Sample Size------------------						
Percentages	1500	1000	750	600	400	200	100
near 10	2	2	3	3	4	5	7
near 20	2	3	4	4	5	7	9
near 30	3	4	4	4	6	8	10
near 40	3	4	4	5	6	8	11
near 50	3	4	4	5	6	8	11
near 60	3	4	4	5	6	8	11
near 70	3	4	4	4	6	8	10
near 80	2	3	4	4	5	7	9
near 90	2	2	3	3	4	5	7

The table would be used in the following manner: Let us say a reported percentage is 33 for a group which includes 1500 respondents. Then we go to row "percentages near 30" in the table and go across to the column headed "1500". The number at this point is 3, which means that the 33 per cent obtained in the sample is subject to a sampling error of plus or minus 3 points. Another way of saying it is that very probably (95 chances out of 100) the average of repeated samplings would be somewhere between 30 and 36, with the most likely figure the 33 obtained.

In comparing survey results in two samples, such as, for example, men and women, the question arises as to how large must a difference between them be before one can be reasonably sure that it reflects a real difference. In the tables below, the number of points which must be allowed for in such comparisons is indicated.

Two tables are provided. One is for percentages near 20 or 80; the other for percentages near 50. For percentages in between, the error to be allowed for is between that shown in the two tables:

Recommended Allowance for Sampling Error of the Difference

In Percentage Points (at 95 in 100 confidence level)

(The chances are 95 in 100 that the sampling error is not larger than the figures shown.)

TABLE A

Size of sample	Percentages near 20 or percentages near 80			
	750	600	400	200
750	5			
600	5	6		
400	6	6	7	
200	8	8	8	10

TABLE B

Size of Sample	Percentages near 50			
	750	600	400	200
750	6			
600	7	7		
400	7	8	8	
200	10	10	10	12

Here is an example of how the tables would be used: Let us say that 50 per cent of men respond a certain way and 40 per cent of women respond that way also, for a difference of 10 percentage points between them. Can we say with any assurance that the 10-point difference reflects a real difference between men and women on the question? The sample contains approximately 750 men and 750 women.

Since the percentages are near 50, we consult Table B, and since the two samples are about 750 persons each, we look for the number in the column headed "750" which is also in the row designated "750". We find the number 6 here. This means that the allowance for error should be 6 points, and that in concluding that the percentage among men is somewhere between 4 and 16 points higher than the percentage among women we should be wrong only about 5 per cent of the time. In other words, we can conclude with considerable confidence that a difference exists in the direction observed and that it amounts to at least 4 percentage points.

If, in another case, men's responses amount to 22 per cent, say, and women's 24 per cent, we consult Table A because these percentages are near 20. We look in the column headed "750" and see that the number is 5. Obviously, then, the 2-point difference is inconclusive.

* * *

SECRETARY KLEIN: It was a pleasure to have you here, and to you and Mr. Robinson, who waited so long, I say thank you very much for waiting during this period of time. We appreciate it.

Are there any questions from the conferees on my left?

(No response)

SECRETARY KLEIN: From the conferees on my right?

(No response)

SECRETARY KLEIN: Thank you very much, Mr. Farrar.

I think that I agree with you that the people are willing to pay additional taxes if they know what the alternatives are if they don't pay these taxes; and that they are willing to get the Potomac back into shape and they are willing to pay these costs if necessary.

Is there anybody here today who wanted to be called on that we did not know about earlier?

Sir, do you have a statement?

MR. DIXON: Yes, Mr. Chairman. Mr. Jensen has a copy of it there, and I believe they are producing more copies of it now.

SECRETARY KLEIN: Mr. Dixon, if you are having it copied, I would appreciate it if you would do like the other witnesses and please reduce it to essentials.

MR. DIXON: Yes, sir.

SECRETARY KLEIN: Thank you, Mr. Dixon.

STATEMENT OF
MR. J. W. DIXON
CONSULTING ENGINEER
ARLINGTON, VIRGINIA

MR. DIXON: Mr. Chairman, conferees and participants:

Can you hear all right?

SECRETARY KLEIN: Fine.

MR. DIXON: I speak as a consulting engineer with more than 40 years of experience in the water resources field and their economic effects upon surrounding areas.

I speak also as the owner of a moderately sized power cruiser.

The heading of my paper is "Pleasure Boats."

It has been my privilege of being a member of National boating associations, the U. S. Power Squadrons, a U. S. Coast Guard Flotilla, and for more than twenty years a licensed commercial operator. I have owned and operated fourteen power and sailboats.

SECRETARY KLEIN: Sir, I asked you to summarize. I would appreciate it if you would because we put you on. Otherwise, you have five and-a-half pages. I would not want to ask the people here to stay and listen to it. Will you please summarize?

MR. DIXON: Yes, sir.

SECRETARY KLEIN: I think I can give it to you very generally. You want to dump your sewage raw into the river from a pleasure boat. Is that the gist of it?

MR. DIXON: Yes, sir, until they get the research on the water pollution.

SECRETARY KLEIN: I read the paper, and I am sorry, sir, but we are passing a bill in Congress and you are going to have to put something on there.

I know that the people here would not want to swim in it. If you want to swim in it, collect it through your bathtub.

Go ahead if you have any comments to make with regard to my comments.

As far as sewage from vessels are concerned, you have no more right to pollute the Potomac than anybody else has.

MR. DIXON: Have you suggested that they stop the research?

SECRETARY KLEIN: No, sir. As a matter of fact, the Federal Water Pollution Control Administration is going full blast on what should be done therein.

There was something I just saw at the Boat Show and I call it to your attention. It is a portable toilet, and all you have to do is pull off the bottom of it and take it home and dump it in your toilet and it will work beautifully, and it is very minimal in cost.

MR. DIXON: Another thing that is probably needed in the legislation: There is no reason in the world, so far as the legislation is concerned, as I understand it, that you couldn't take a cedar bucket and just dump it overboard.

SECRETARY KLEIN: Yes, sir, and if the Coast Guard catches you, you will get a good fine.

MR. DIXON: But I don't think that is--

SECRETARY KLEIN: That is what is in there.

MR. DIXON: I think you should plug the law on that point.

SECRETARY KLEIN: No, sir. I'm afraid we are going to check your boat as well as everybody else's and make sure you don't dump anything into the river also.

I don't think, as Mr. Farrar said, that anybody has the right to pollute the river.

If you can own a pleasure craft--I'm sorry, sir, and I have said this many times in Illinois and elsewhere--you can afford the extra expense of taking care of the pollution from it.

MR. DIXON: Have you a boat?

SECRETARY KLEIN: Yes, sir, and I have some on my boat, or else I put into shore.

MR. DIXON: If you use the shore, then it goes back into the river.

SECRETARY KLEIN: No, I use the toilet on the shore.

Thank you.

MR. DIXON: You have summarized my paper without the reasons.

SECRETARY KLEIN: The reasons have all been given before Congress so many times it isn't funny.

I will go along with Mr. Farrar. We have some real problems on industrial and on human sewage and on farm sewage, because industry furnishes taxes and payrolls, farmers furnish food, and homeowners live in the area, and it is a necessary proposition.

But when we get to a recreational boat, that is a luxury, and there I won't bend one single inch. We will try to solve the other problems, but this one should not have been a problem in the first place, and a boatowner, who can afford a luxury, can take care of that luxury so he doesn't do any polluting.

This is my opinion. I don't know whether the gentlemen up here agree with me or not, but I think that they would. They have their hands full with some real problems, and they don't want to bother with a small problem. That only makes it worse.

Thank you.

(The following is the balance of the statement submitted by Mr. Dixon for the record:)

This is all merely to express my credentials to assemble a few observations and facts on the necessity to postpone for several years at least, the enforcement of treatment, or withholding facilities for sanitary effluents from medium-sized power cruisers and cabin sailboats.

A. Degree of Pollution

(1) In the Metropolitan Washington area, it is reported that 90% of the pollution results from human wastes and storm runoff; 10% is reported to come from industry and upstream sources, especially from farmyards, feed lots and chemicals used in the fields, plus a minute quantity from pleasure boats.

(2) It is reported that probably less than 1/2000th of the pollution that enters the area under consideration (Little Falls to Hallowing Point) is from pleasure craft.

(3) Tests made before, and then again after a major regatta here in Washington, disclosed only a trace increase during this entirely abnormal increase in the number of anchored craft, most of which had more guests aboard than usual.

(4) Pollution in the Metropolitan area, even upstream from Little Falls, are reported to have worsened during the past several years. This is due,

obviously, to conditions outside this Metropolitan area.

(5) Thus, the effects from pleasure craft are minimal, and the realistic place to start any cure is with the 99.95% of pollution which arises from other sources.

B. Boat Equipment Available

(1) Standard equipment disintegrates but does not treat boat effluents. Very heavy, bulky and costly chlorinators are installed on a few craft, but they come far from reaching the adopted pollution criteria.

(2) There is no commercially available equipment suitable for such craft on the market today, at any price.

(3) The Federal Water Control Administration advises that it has or is about to award a research contract to develop suitable equipment.

(4) Private research toward the same objective is also under way.

(5) This research will require several years, following which manufacturers will have to start production, which will require even more years before the millions of craft throughout the country can replace their now standard equipment with the new equipment.

(6) It is unlikely that the Washington Metropolitan area would be given any significant priority to receive the new types of equipment.

(7) An official of the Federal Water Pollution Control Administration advised the author that it would be at least five years before any serious consideration would be given to the pleasure craft solution.

C. Holding Tanks (Not the Solution)

(1) Because of the very large number of pleasure crafts that use the waters between Little Falls and Hallowing Point, at least nine pumping stations would be necessary, generally in the following areas:

1. Key Bridge
2. Columbia Island Marina
3. Washington Harbor
4. Ft. McNair Marina
5. Anacostia Marina
6. Alexandria
7. Fort Washington Marina
8. Fort Belvoir
9. Hallowing Point

(2) The experiment proposed by FWPCA, to be carried out at the Anacostia Marina (viz. to install

free to each boatowner whose craft is moored there, a suitably designed holding tank, and to provide a pumping station and free disposal service, is impractical unless many other pumping stations are provided throughout the entire Potomac River and Chesapeake Bay. Crafts that cruise the River and the Bay cannot come back up to the Anacostia Marina every time their tank needs emptying.

(3) Who is to pay for the installation, servicing, of these many additional pumping stations, with their own large storage tanks, and tank-trucks to carry the collected effluents to a sewage treatment plant many miles away?

(4) Pumping stations on rivers and bays could be as far apart as 20 miles, except in areas of concentrated boating activity such as Metropolitan areas such as Washington, or in Annapolis, Baltimore, Piney Point, Smith Creek, etc.

(5) Few, if any except very large boats, have enough storage space for a holding tank of say 35 to 40 gallons (the minimum necessary for a craft that carries a fresh water supply of 20 gallons).

(6) Weights of storage tanks would be awkward, for, due to the necessity to keep a craft evenly

"trimmed" (balanced) they would likely have to be on one side or other of the boat due to equipment already installed.

(7) Very few pleasure craft have space (depth between the cockpit floor and the bottom of the hull) to accommodate sizable holding tanks.

(8) "Heads" (toilets) are invariably small, and would not have space to accommodate a suitable holding tank.

D. Use of the Waterfront--Washington Harbor

(1) The proposal is that development of large portions be privately financed.

(2) The proposed Ponte Vecchio Bridge appears to be dying, if not dead, because of lack of interest in financial support from the private sources.

(3) Washington's oldest marina accessory supply firm, Nash Marine, is moving out of the city.

E. This is a Conference of Coordinating Officials

(1) Need for Coordination--is essential, not only between Federal, State and District of Columbia jurisdictions but also among Federal agencies.

(2) Notwithstanding the view of the FWPCA, see paragraphs B(3) and B(7), that a considerable number of years would pass before they would consider seriously the most suitable solutions for pleasure craft, another Federal agency, The Redevelopment Land Agency, which is responsible for the redevelopment of SW and SE Washington, including the harbor and a large marina, has explained to me and to one of my clients who had rights for development of a marine facility that no matter what the FWPCA said, that as a Federal agency, RLA would require immediately holding tanks or padlocks on the "heads" while they were berthed at the marina. On the face of it, this would be ineffective and the whole procedure would be premature.

(3) The Interior Department owns and grants concessions at at least three marinas, Columbia Island, Ft. McNair and Anacostia and wisely has not imposed any such requirements for their own concessions. The FWPCA is a part of the Interior Department--RLA is not, yet it applies a FWPCA law which FWPCA consider is not yet ready for application.

(4) I advised my client not to invest in what would be a money-losing investment because of the

above and other limitations.

SECRETARY KLEIN: Gentlemen, if there is nothing further, the conference will recess until 9:00 in the morning.

(Whereupon, at 4:50 p.m., an adjournment was taken until Friday, April 4, 1969, at 9:00 a.m.)

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☆ U. S. GOVERNMENT PRINTING OFFICE : 1969 O - 365-427 (Vol. 2)